AMERICAN METEOROLOGICAL SOCIETY
5515
72m

meteorological

bstracts and bibliography

Sponsored by
AIR FORCE CAMBRIDGE RESEARCH CENTER

Bibliography on Jet Stream

l. 4 July, 1953 No. 7

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

Editor and Technical Supervisor: MALCOLM RIGBY

Corresponding Editor: DR. C. E. P. BROOKS

EDITORIAL STAFF

ANDREW ASSUR, *Analyst*
ISADORE L. DORDICK, *Analyst*
DOROTHY M. GROPP, *Cataloguer*
MOLLIE P. KRAMER, *Bibliographer*
KATHERINE MARTINOFF, *Technical Editor*
WILHELM NUPEN, *Analyst*
MARY L. RICE, *Assistant Editor-Bibliographer*
WINIFRED SCHRAITLE, *Cataloguer*
GEZA THURONYI, *Bibliographer*
MARIA WLATSCHUGA, *Assistant Technical Editor*
NIKOLAY T. ZIKEEV, *Bibliographer*

*EDITORIAL OFFICE: Washington, D. C. P.O. ADDRESS: Box 1736, Washington 13, D. C. Telephone: REpublic 7-6278.

ADMINISTRATIVE OFFICE: American Meteorological Society, Office of Executive Secretary, 3 Joy Street, Boston 8, Mass.

* Address all business communications, orders and inquiries to the Executive Secretary, Mr. Kenneth C. Spengler, 3 Joy Street, Boston 8, Mass. Exchanges and reprints may be sent direct to P. O. Box 1736, Washington 13, D. C.

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY is a monthly publication devoted to:

A. Current Abstracts in English on important meteorological literature in every language.

B. Bibliographic references to other items of interest to the profession.

C. Selective, annotated bibliographies on subjects of immediate and special interest to meteorologists.

SUBSCRIPTION RATE: $9.00 per year to members and non members. Single and back issues $2.00. Back volumes, $10 per volume.

This publication has been made possible through support and sponsorship extended by the Geophysics Research Directorate of the Air Force Cambridge Research Center, Air Research and Development Command under Contract No. A. F. 19 (604)-302.

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 4 JULY, 1953 No. 7

SPECIAL FEATURE IN THIS ISSUE

A Selective Annotated Bibliography on the Jet Stream

(*For complete table of contents see back cover*)

Published monthly at Prince and Lemon Streets, Lancaster, Pa., by the AMERICAN METEOROLOGICAL SOCIETY, 3 Joy Street, Boston 8, Mass.

Printed and issued by: Lancaster Press, Inc.

FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to ing to the attention of meteorologists current literature in their field and in related fields and provide bibliographic information on various subjects, as interest demands.

Part I contains from 175 to 300 abstracts of current periodical literature and monographs in e fields of meteorology, hydrology, oceanography, etc. These abstracts are arranged cording to the Universal Decimal Classification.

Part II of each issue comprises a special annotated bibliography of from 50 to 250 im- rtant references on a special subject without respect to recency of material. No attempt made to prepare exhaustive bibliographies; instead, the aim is to include a representative oss section of the various aspects of a subject. Preference is given to recent material, mprehensive works, material from obscure sources, and items with good bibliographies.

Bibliographies previously published were:

o. Mo.	Vol. I, 1950	Vol. II, 1951	Vol. III, 1952
. Jan.	**Atmospheric Pollution**	**Extended Forecasting**	**Climate—Northwest Africa**
. Feb.	**Aerobiology**	**Long Range Forecasting**	**Carbon Dioxide**
. March	**Cloud Physics**	**Soil Temperature**	**Climate—Argentina, etc.**
. April	**Hail**	**Constants, Tables, etc.**	**Dew**
. May	**Tornadoes**	**Climate—Near East**	**Objective Forecasting**
. June	**Volcanic Dust**	**Climate—Middle East**	**Stratus Forecasting**
. July	**Climatic Changes**	**Special Winds**	**Urban Climatology**
. Aug.	**Thunderstorms**	**Radar Storm Detection**	**Climate—Central Africa**
. Sept.	**Icing**	**Condensation Trails**	**Visibility**
. Oct.	**Acoustical Propagation**	**Climate—Northeast Africa**	**Glaze and Rime**
. Nov.	**Evaporation**	**Mountain Meteorology**	**Free Air Turbulence**

Bibliographies published this year are:

1. **Turbulence Theory,** Vol. IV, No. 1, Jan. 1953
2. **Turbulent Diffusion and Exchange,** Vol. IV, No. 2, Feb. 1953
3. **Frost and Frost Forecasting,** Vol. IV, No. 3, March 1953
4. **Climate of Australia and New Zealand,** Vol. IV, No. 4, April 1953
5. **High Level Winds (500–100 mb),** Vol. IV, No. 5, May 1953
6. **High Level Winds (above 100 mb),** Vol. IV, No. 6, June 1953
7. **Jet Stream,** Vol. IV, No. 7, July 1953

Forthcoming bibliographies will be:

8. **Radiation Bioclimatology,** Vol. IV, No. 8, Aug. 1953
9. **Meteorology and Oceanography of the Pacific,** Vol. IV, No. 9, Sept. 1953
10. **Auroras,** Vol. IV, No. 10, Oct. 1953
11. **Sferics,** Vol. IV, No. 11, Nov. 1953

Other bibliographies in preparation are:

Actinometers
Arctic Meteorology
Auroral Physics
Climate of Southeast Asia and the East Indies
Machine Methods in Meteorology
Microwave Propagation
Oceanographic Meteorology
Ozone
Radiation data
Snow Cover
Tropical Cyclones
Tropopause Variations

Part III contains a listing of the contents of those journals which are primarily meteoro- gical. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. In the December issue mulative author, subject, geographical and journal indexes are published.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where th material may be found. The Union List of Serials (Gregory) is the source of most of th symbols used. In some cases, where no symbol has been assigned to a library, one will b devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DSG:	U. S. Army Medical Library, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory (and American Meteorologica Society) Library, Milton, Mass.
NN:	New York Public Library, New York, N. Y.
NNA:	American Geographical Society Library, New York, N. Y.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts

Geographic locations are in the English form rather than the form used locally, for example Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwis stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to th Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months ar abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Numbe (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus a entry will read as follows:

Meteorologische Rundschau, 2(5–6):146–151, May–June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (Vo 2), *Heft* 5–6 (No. 5 and 6), *pages* 146–151, May–June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

COMPENDIUM ARTICLES AND WORKS OF SPECIAL INTEREST

4.7–1 55:681.177

Bellamy, John C. (*Cook Res. Labs. Chicago*), **Automatic processing of geophysical data.** *Advances in Geophysics*, N. Y., 1:1–43, **1952.** 7 figs., 7 refs., 3 eqs. **DLC**—The two main types of punched card (80 column and 45 column) and types of machines (verifier, sorter, interpreter, reproducer, collator, calculating punch and tabulators) are described and the use of these machines in processing radiosonde data is described in outline form as an example of use of machines to process geophysical data. High speed and large scale digital computers are then described (using punched cards, photo or magnetic type). Mechanical, electro-mechanical and electronic systems, analog inputs directly from the radiosonde signals are suggested as a practical possibility. Limitations of analog methods are enumerated (lower accuracy, 0.1 to 1% error) compared with perfect accuracy of digital computers. Manual operations are not entirely eliminated in any of these methods. Storage, visualization and processing problems are evaluated to indicate the future developments or perfections to be achieved. *Subject Headings:* **1. Record analysis 2. Punched card analysis 3. Automatic computers 4. Radiosonde data processing 5. Geophysical data 6. Advances in geophysics.** —*M.R.*

4.7–2 551.508:551.501.1

Ference, Michael, Jr. (*Evans Signal Lab., Sig. Corps Engr. Lab.*), **Instruments and techniques for meteorological measurements.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 1207–1222. 9 figs., 35 eqs.) **MH-BH**—In this comprehensive survey of the more recent equipment and techniques developed for making meteorological measurements the author presents "a functional description of equipment or technique, followed by a more detailed examination of the major components of the equipment with the view of analyzing errors and presenting an over-all evaluation of the system." The contents of this review are as follows: 1) radiosonde-radiowind systems, namely, radiosonde light equipment, radiosonde ground equipment and radar-wind and radarsonde systems; 2) meteorological balloons; this section deals with their altitude performance, temperature effects on balloons and their ascensional rates; parachute radiosondes—their telemetering systems; the operating characteristics of the radiosonde units measuring temperature, pressure and humidity, the characteristics of the radio transmitter and of the parachute; 3) wire sondes; 4) automatic weather stations, namely, the code-type automatic weather stations and 5) ceilometers; the pulsed light and radar types. Some of the general trends in experimental techniques noted are the introduction of radar, basic development in electro-mechanical systems and in sensitive infrared devices, development of versatile analogue computers and in sensitive infrared devices, and new concepts in communication theory. The need for further research on methods of low temperature hygrometry, less expensive methods for studying troposphere and middle stratosphere and improved methods of data presentation is stressed. The article contains illustrations and circuit diagrams of various types of equipment. (Aerographs, sferics and storm detection equipment are not discussed.) *Subject Headings:* **1. Meteorological instruments 2. Observation techniques 3. Compendium articles.**—*I.L.D.*

4.7–3 551.509.5:551.46(02,26)

Kudriavaia, K. I., **Morskie gidrologicheskie prognozy.** [Marine hydrological forecasts.] Leningrad, Gidromet. Izdat., **1951.** 275 p. 135 figs., 64 tables, 112 refs. **DLC**—A new technical work intended as a text for university students of oceanography, hydrology and

hydrography, with special emphasis on forecasting sea ice, temperatures, levels, state of sea and currents in the open ocean, gulfs and bays. The basis of the methods treated are synoptic and objective tools (analogs, regression curves, anomaly charts and historical or climatological data), and the types of forecasting include short, medium, seasonal and long range forecasting. The basic theory is developed in each chapter, followed by quantitative application and examples. The chapters on ice, wave and current forecasting include material on methods of observation and give critical evaluation of dependability of methods studied. *Subject Headings:* **1. Marine meteorology 2. Hydrologic forecasting 3. Oceanographic forecasting 4. Text books. I. Vize, Vladimir IUI'evich.** (*ed.*).—*M.R.*

4.7–4 551.509:532.593:551.46

Munk, Walter Heinrich (*Univ. of Calif.*), **Ocean waves as a meteorological tool.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 1090–1100. 14 figs., 2 tables, 16 refs.) **MH-BH**—The various methods involving the propagation of ocean surface waves as an aid in weather forecasting are described and their validity is examined. These methods are: 1) the height power method applied to visible swell; 2) the frequency spectrum method applied to forerunners of swell and 3) the storm surge method. The relative merits of these methods from the point of view of instrumentation, success in storm location, range of effectiveness and estimation of storm intensities are examined and "some of the disadvantages and advantages of these methods as compared to methods involving the propagation of sound waves through the sea bottom (microseisms) and electromagnetic waves through the atmosphere (radar and spherics)" are pointed out. To render these methods more useful additional studies on ocean wave forecasting for HT method, increase in network of stations for FA method and improved instrumentation for SS method, are required. *Subject Headings:* **1. Ocean waves 2. Weather forecasting 3. Swell 4. Forecasting techniques 5. Compendium articles.**—*I.L.D.*

4.7–5 551.556:551.46

Munk, Walter Heinrich and Arthur, Robert S., (*Univ. of Calif.*), **Forecasting ocean waves.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 1082–1089. 4 figs., 2 tables, 25 refs.) **MH-BH**—The categories of sea, swell and surf are described and the degree of the dependence of their characteristics upon the meteorological situation is indicated. The theoretical-empirical method of forecasting significant waves, which is based upon the development of equations which express the energy budget between wind and wave is presented. It is based upon the hydrodynamical theories of irrotational waves of Airy for waves of small amplitude and of Stokes for waves of finite amplitude. Certain constants occurring in the solution are evaluated empirically. The empirically obtained graphs of SUTHONS for forecasting sea and swell are discussed. The characteristics of the wave spectrum, its interpretation by means of harmonic analysis and the attempts to forecast it are summarized. Problems in wave forecasting are the deviation of physical laws determining the growth of the component wave trains under wind action, forecasting the transformation of swell travelling through the region of decay and predications of waves and swell from tropical storms. *Subject Headings:* **1. Ocean wave forecasting 2. Wind waves 3. Swell 4. Wind-wave relationships 5. Compendium articles.**—*I.L.D.*

4.7–6 551.543:519.241.

Schumann, Theodor E. W. and Van Rooy, M. P., **Die Outokorrelasie van Daagliks Seevlak-Lugdruk oor die Noordelike HALFROND.** [The auto-correlation of daily sea-level pressure over the Northern Hemisphere.] *South Africa. Weather Bureau, W.S.* 17, Jun **1952.** 7 p. 11 charts, 10 refs. In Afrikaans and English. Price: 4/–. **DWB**—The authors present a further valuable result of statistical studies based on the "Historical weather maps" of the U. S. Weather Bureau (*see also item* 4.2–14, Feb. 1953, *MAB*). Autocorrelation coefficients are given for the intersections of each 10° longitude and latitude from 20°N to 60°N (except for 40°E to 140°E). The calculations are extended up to 30 days in the winter and unfortunately, only up to 15 days in the summer. Maps represent the geographical distribution of autocorrelation coefficients for 1, 2 and 6 days (winter and summer), of the wind speed in the 500 mb level (Jan. and July), of the annual range of autocorrelation coefficients and the

fluence of long lasting anomalies ("secular" variations in the terminology of the authors) on e autocorrelation. It is shown that there is a negative correlation between persistence and 00 mb winds. The smallest persistence on the whole Northern Hemisphere is found over ortheastern United States and Japan, the greatest on the west coast of Europe, the Arctic and e eastern part of the Pacific. *Subject Headings:* **1. Autocorrelations 2. Persistence Pressure 4. Northern Hemisphere.**—*A.A.*

4.7–7 551.524.2:551.557

Shuleĭkin, V. V., **Zimnee temperaturnoe pole nad morem i materikom pri peremennom oeffitsiente obmena.** [Winter temperature field over the oceans and continents with variable change coefficient.] *Akademiia Nauk SSSR, Doklady*, 83(3):389–392, **1952.** 2 figs., refs., eqs. **DLC**—A theory for the calculation of the temperature field on a round continent or land in an unlimited ocean, or on a round sea in an unlimited continent is developed Assuming that the coefficient of heat exchange is proportional to the area of the continent or sea he author gives the differential equation for the continent: $r^2\frac{d^2\tau}{dr^2}+3r\frac{d\tau}{dr}-\frac{\tau}{u}\tau=0$; where =radius of the continent, $\tau=t-t_0$, t—actual average temperature of the active layer of the mosphere, t_0=temperature, which would be under the given latitude on an earth without eans; σ=coefficient, determined by observations, $n=\frac{\sigma}{3}$=coefficient in the assumed relationip, $K=nr^2$, where $K=AH$, A=exchange coefficient, H=height of the active layer of the mosphere. A similar equation is given for the calculation of the temperature distribution ver the sea. Solutions of the differential equation presented. *Subject Headings:* **1. Temerature distribution 2. Heat exchange.**—*A.A.*

4.7–8 551.573(26)

Sverdrup, Harald U. (*Norwegian Polar Inst. Oslo*), **Evaporation from the oceans.** (In: **ompendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 1071–081. 3 figs., 2 tables, 30 refs., 37 eqs.) **MH-BH**—The various methods for determining aporation from the ocean, reviewed by the author are: 1) evaporation from the oceans etermined by extrapolation of values from land, 2) direct measurements of evaporation at a and 3) evaporation from the oceans computed from meteorological elements. The history each method is given, the fundamental equations are developed, the theoretical considerations are analyzed and the results obtained are presented. *Subject Headings:* **1. Evaporation om seas 2. Evaporation measurement 3. Compendium articles.**—*I.L.D*

4.7–9 551.515.2(729, 75)(02)

Tannehill, Ivan Ray (*Chief, Div. Synoptic Reports and Forecasts, U.S.W.B.*), **Hurricanes, eir nature and history, particularly those of the West Indies and the southern coasts of the nited States.** 8th ed. Princeton, Princeton Univ. Press, **1952.** 308 p. 137 figs., tables, ibliog. p. 295–303. **DWB**—One of the most popular books on a meteorological subject ever ritten, this compilation of most of the scientific and historical material on hurricanes has one through 8 editions since it first appeared in 1938. The chapter in the 7th edition on new echniques in hurricane location and forecasting developed during the war (radar, microseisms, rplane reconnaissance, automatic weather stations, sferics, etc.) has been brought up to date y inclusion of data on storms of the 1950 and 1951 seasons, and additional bibliographic eferences. The basic part of the text (chapters on origin, observation, winds, tornadoes, torm tides or waves, tracks, rainfall in hurricane areas, pressure, clouds, damage and warnings, esides many accounts of historical storms, chronology of all known West India hurricanes and requency tables) remains the same. (For 7th ed. *see item* 3.5–13, May 1952, *MAB.*) *Subject Headings:* **1. Hurricanes 2. Hurricane forecasting 3. Textbooks 4. West Indies.**—*M.R.*

4.7–10 551.556:532.59

Tenani, M., **Nozioni teoriche fondamentali sulla formazione e trasformazione delle onde. uovi metodi grafici di calcolo e di previsione.** [Fundamental theoretical notions on the rmation and transformation of waves. A new graphic method of measuring and predicting.]

Italy. Istituto Idrografico, Genoa, I.I.3125, **1952.** 126 p. 33 figs. (some fold.), tables, refs eqs. **DWB**—One of the most comprehensive studies on sea surface waves. The theoretica part discusses period, length, propagation and attenuation of waves for deep water, energ transport and modification and the influence of wind, and gives intuitive considerations of th development of waves and their energy balance. Numerous nomograms facilitate the practica application of the theory. The experimental verification of the theory is discussed and series of empirical relationships commonly used, analyzed. Considerable effort is devoted t the prediction problem of the state of the sea dependent on meteorological conditions (surfac wind calculations from isobar maps, effect of wind speed and duration, etc.). Synopti situations leading to swells, discussed. Chap. IV deals with waves in shallow water; Chap. V with the breaking of waves. Verification of the theoretical predications by means of photo graphs, discussed. *Subject Headings:* **1. Ocean wave forecasting 2. Wave formation 3. Swell 4. Nomograms.**—*A.A.*

GENERAL METEOROLOGY

4.7–11 551.5:06

World Meteorological Organization, **Resolutions in force, January, 1952. 1952.** Each section repaged. Mimeographed. **DWB**—All of the important resolutions of the IMO now in force, with respect to the work of each commission, are reproduced in a rough chronological fashion in English for each of the commissions now in existence (Aerology, Aeronautical Meteorology, Agricultural Meteorology, Bibliography and Publications, Climatology, Instruments and Methods of Observation, Maritime Meteorology, Synoptic Meteorology, and Organization in General). Many resolutions now in force date back to the Vienna Conference of 1873. The purpose of this publication is to enable the presidents and members of the new WMO Commissions to quickly survey the technical resolutions which affect their commissions without the necessity of combing through scores of publications, many of which are difficult to obtain or unobtainable. *Subject Heading:* **1. WMO Resolutions.**—*M.R.*

4.7–12 551.5:35

OR: weapon for peace. *Johns Hopkins Magazine*, New York, 4(1):4–9, 33–36, Oct. **1952.** photos. **DLC**—A detailed description of the various activities and objectives of "Operations Research"—A Johns Hopkins University Project directed by DR. ELLIS A. JOHNSON (geophysicist). The purpose of this group, now located at Chevy Chase, Md., is to integrate research capabilities of scientists in many fields (Nuclear Physics, Astrophysics, Mathematics, Biology, Geology, Meteorology, Psychology, Geography, Anthropology, Sociology, Chemistry, etc.) in order to provide answers to complicated problems of defense which involve more than one specialty. A photograph of MRS. KATHARINE CLARK HAFSTAD, the meteorologist attached to OR, is included. *Subject Headings:* **1. Operations Research 2. Applied meteorology 3. Military meteorology. I. Johnson, Ellis A. II. Hafstad, Katharine Clark III. Johns Hopkins University.**—*M.R.*

4.7–13 551.5:622

Chełchowski, W., **Meteorologia a górnictwo.** [Meteorology and mining.] *Gazeta Obserwatora PIHM*, Warsaw, 4(3):16–17, March **1951. DLC**—A review and a compendium of an article by B. HRUDICKI published in *Meteorologické Zpravy* (No. 1, 1948), under the title "Meteorology in the mining industry." The article shows that meteorology contributes greatly to the solution of many organizational problems in the mining industry. *Subject Headings:* **1. Mining meteorology 2. Reviews 3. Hrudicki, Bohuslav.**—*A.M.P.*

4.7–14 551.5:629.12/3

Satow, P. G., **Meteorology and navigation.** *Institute of Navigation, London, Journal*, 5(3):203–222, July **1952.** 9 figs., 6 refs. **DLC**—Author deals with the importance of meteorological information and gives examples of its application in marine and air navigation. Particular attention is given to the extension of information to the upper atmosphere. British upper air bulletins now include observed and predicted contour charts for 200 and 100 mb. Climatological analysis is being made for 14 standard pressure levels (shown in a diagram), from the surface up to 40 mb, by a new branch of the British Meteorological Office. Physical

properties of the tropopause are described and its variability in height illustrated by an example: an observed drop from 41,000 to 24,000 ft in 24 hrs, at a single upper air station. Photographs of a cumulus pillar and of an anvil which will reach heights of at least 45,000 ft are presented. The article includes a discussion by FRANKCOM, SATOW and FRASER. *Subject Headings:* **1. Aerial navigation 2. Marine navigation 3. Upper atmosphere research 4. Tropopause. I. Frankcom, C. E. N. II. Fraser, D. O.**—*G.T.*

4.7–15 551.5:629.13(03):44:46

International Civil Aviation Organization, **Lexicon of terms in connection with International Civil Aviation.** ICAO, **1952.** 197 p. appends. In English, French and Spanish. **DWB**—A glossary of about 2500 terms in use by ICAO in the fields of aviation, cartography, communications and meteorology, alphabetized in English, with French and Spanish equivalents, and definitions in English for 625 of these expressions. The terminology included herein is by no means exhaustive for the above fields, but is intended to serve as a starting point for more comprehensive future editions. Many cross references and citations are noted. The meteorological terminology includes many popular phrases, wind and cloud terms, observational and forecast terms, and a section on units, abbreviations, tables of notations for units and parameters and a list of ICAO publications from which definitions were obtained, all in 3 languages. *Subject Headings:* **1. Aviation terminology 2. Glossaries 3. French language 4. Spanish language 5. International Civil Aviation Organization.**—*M.R.*

4.7–16 551.5:779:37

Popular Science Publishing Co., Inc. Audio-Visual Div., **Weather; a series of three Teach-O-Filmstrips.** Includes: **Teaching Guide and three filmstrips TOF 111, We learn about weather; TOF 112, Changes in weather; TOF 113, Understanding weather conditions.** New York, Popular Science Publishing Co., Inc., **1950.** 147 frames. Price: $19.50. **DWB**—A manual is included with the 3 rolls of film, describing and illustrating the material and giving a short bibliography for: 1) primary, 2) intermediate and 3) junior high school students and teachers, supplementing the 3 films which are designed for these 3 groups, respectively. The strips give pictures and ask questions leading to a knowledge of moisture conditions, expansion processes, air movements, convection, air masses, storms, atmospheric structure, etc. in an ever more advanced manner. *Subject Headings:* **1. Meteorological films 2. Elementary meteorology 3. Teaching of meteorology 4. Visual aids.**—*M.R.*

4.7–17 551.5:779:37

Popular Science Publishing Co., Inc. Audio-Visual Div., **Weather and climate.** Includes: **Teaching Guide and filmstrip TOFS16.** New York, Popular Science Publishing Co., Inc., 1951. 48 frames. Price $3.50. **DWB**—This film is intended for junior or senior high school science students, and is more advanced than the 3 other films (*see* 4.7–16 above) dealing with elementary meteorology. Fronts, weather maps and the causes of and changes in seasons and climate in various parts of the earth are taken up in evolutionary fashion. *Subject Headings:* **1. Meteorological films 2. Visual aids 3. Teaching of meteorology 4. Elementary meteorology.**—*M.R.*

4.7–18 551.5:92

Flohn, Hermann, **Wilhelm Meinardus.** *Meteorologische Rundschau*, 5(9/10):184, Sept./Oct. **1952. DWB**—Born July 14, 1867 at Oldenburg, died Aug. 28, 1952. Worked in Prussian Meteorological Institute, became Professor of Geography at Münster 1906, Göttingen 1920. Taught many well known meteorologists. Best known for work on meteorology of oceans and Antarctica. *Subject Headings:* **1. Biography 2. Meinardus, Wilhelm.**—*C.E.P.B.*

4.7–19 551.5:92

Heyer, Ernst, **Nachruf auf Professor Dr. Wilhelm Meinardus.** [Prof. Dr. Wilhelm Meinardus, obituary.] *Zeitschrift für Meteorologie*, 6(10):289–290, Oct. **1952. MH-BH**—Wilhelm Meinardus born July 14, 1867, died Aug. 28, 1952. A brief account of his scientific career, in particular his contributions to meteorology and climatology is given. *Subject Headings:* **1. Obituaries 2. Meinardus, Wilhelm.**—*I.L.D.*

4.7–20 551.5:92

Phillips, Horst, **Nachruf auf Dr. Johannes Goldschmidt.** [Dr. Johannes Goldschmidt obituary.] *Zeitschrift für Meteorologie*, 6(12):353–354, Dec. **1952. Verzeichnis der wissenschaftlichen Veröffenlichungen von Dr. Johannes Goldschmidt.** [A list of scientific publications of Dr. Johannes Goldschmidt.] *Ibid.*, p. 354–355. **DWB**—Johannes Goldschmidt was director of the Meteorological Observatory Wahnsdorf of the Meteorological and Hydrological Service of the German Democratic Republic. He was born Aug. 24, 1894 in Dresden and died Nov. 1, 1952. His interests included atmospheric electricity, radiation measurement and radiation climatology. *Subject Headings:* **1. Obituaries 2. Bibliographies 3. Goldschmidt, Johannes.**—*I.L.D.*

4.7–21 551.5:92:018

Professor Dr. Ernst Kleinschmidt . . . zu seinem 75. Geburtstage am 5.9.1952. [. . . on his 75th birthday.] *Annalen der Meteorologie*, 5(3/5):65–66, **1952. MH-BH**—Head of Bodensee Kite station (1908–24), Wurttemberg State Weather Service (1924–36), Sectional Chief of Deutsche Seewarte (1936–46), published "Handbook of Meteorological Instruments" (1935). A list of his publications is included. *Subject Headings:* **1. Biography 2. Kleinschmidt, Ernst.**—*C.E.P.B.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Instruments, techniques for meteorological measurements** (Ference), 4.7–2; **New formula for saturation vapor pressure of water** (Czarnowski), 4.7–139; **Summer shower distribution over small area** (Beebe), 4.7–156; **Typhoon Kezia and sferics** (Kimpara), 4.7–228; **Analysis of solar and terrestrial atmospheres** (Goldberg), 4.7–232.

4.7–22 551.501.81:551.524.7:551.571.7

Browne, Ian C. **Radar echoes at vertical incidence from a horizontally stratified atmosphere.** *Royal Meteorological Society, Quarterly Journal*, 79(339):157–160, Jan. 1953 2 figs., 8 refs., 4 eqs. **DWB**—On July 12, 1949, on 3.2 cm radar at Cambridge, England, an echo (angel) was received from a horizontal layer 300 ft thick at 4560 ft, attributed to a humidity discontinuity of 40% at an anticyclonic inversion. *Subject Headings:* **1. Radio echoes 2. Upper air humidity.**—*C.E.P.B.*

4.7–23 551.501.81:551.577.1

Browne, Ian C. and Robinson, N. P., **Cross-polarization of the radar melting-band** *Nature*, London, 170(4338):1078–1079, Dec. 20, **1952.** 2 tables, 6 refs. **DWB**—When plane polarized radiation is scattered by non-spherical particles, part of the back-scattered energy is polarized at right angles to the incident wave. Observations at Malvern and Cambridge show that this component is greater in the melting band than below and above freezing level. This may mean that particles in the melting region remain non-spherical until melting is almost completed. It may be useful to detect small quantities of ice in rain clouds. *Subject Heading:* **1. Radar precipitation echoes.**—*C.E.P.B*

4.7–24 551.501.81:551.577.21

*Farnsworth, Gerald (*Ill. St. Water Survey*), **Quantitative radar-rainfall problems** *Illinois. State Water Survey Div., Bulletin*, No. 41:235–239, **1952. DWB**—Brief discussion of the specific problems confronting the Illinois State Water Survey in using radar for quantitative rainfall measurements. How the freezing levels and beam width affect the useful radar range is shown graphically. Values, calculated from the intensities and storm area as observed on isohyetal maps from an eight-mile square rain gage network, are tabulated and the limits of maximum accuracy to expect of a radar to determine rainfall intensities are indicated. Scope photos of 584, APQ-13 and APS-15 radars included. *Subject Headings:* **1. Radar rainfall measurement 2. Rain intensities.**—*W.N.*

4.7–25 551.501.81:551.576.11:551.594.7

Gould, William B. (*Evans Signal Lab., Belmar, N. J.*), **Cloud detection by radar.** *Illinois. State Water Survey Div., Bulletin*, No. 41:209–215, 1952. **DWB**—Brief text accompanied by excellent photos of cloud base and top records taken from the A scope of a 1 cm radar set operating vertically, and from a "novel" gadget: a more or less conventional facsimile recorder modified to the speed of 12 in./hr. The discussion largely deals with the problems of "angels." *Subject Headings:* **1. Radar cloud detection 2. Angels.**—*W.N.*

4.7–26 551.501.81:551.577.21

§*Jones, Douglas M. A. and Hiser, Homer W. (*Ill. St. Water Survey*), **Measurement of point and areal rainfall by radar.** *Illinois. State Water Survey Div., Bulletin*, No. 41:241–254, 1952. **DWB**—During the 1951 thunderstorm season, the Illinois State Water Survey operated a TPL-1, 10 cm searchlight tracking radar and two APS-15A, 3 cm air-borne radars. Thirty-four Bendix-Friez Dual Traverse Model 775-BS rain gages were used in the correlation studies under discussion. The results are shown by means of isohyetal charts and curves showing power-range factor vs. rainfall intensity. *Subject Headings:* **1. Radar rainfall measurement 2. Rain intensities.**—*W.N.*

4.7–27 551.501.81:551.508.94

Kimpara, Atsushi (*Dir. Res. Inst. Atmospherics, Nagoya Univ., Japan*), **Correlation of atmospherics with weather phenomena.** *Nagoya. University. Faculty of Engineering, Memoirs*, 1(2):1947–1957, Oct. 1949. 7 figs., table, 6 refs. **DWB**—The origin of sferics was located by using 2 "instantaneous type direction finders" placed at a distance of 56 km from each other and applying a method of triangulation. The experiment was made at Iwatsuki and Kakioka (both situated in the Kanto Plains) in the fall of 1943. The apparatus and its operation are described. Three examples of successful measurement and coordination are given (Sept. 15, 19 and 20) and two diagrams presented for each of these days, one indicating the origin of sferics as determined by triangulation and the other showing the corresponding weather situation. Tables of directional distribution of sferics at the two stations are presented for the three days investigated. *Subject Headings:* **1. Sferics 2. Triangulation 3. Atmospheric electricity instruments.**—*G.T.*

4.7–28 551.501.83:621.396.821

Schumann, W. O., **Über die Ausbreitung sehr langer elektrischer Wellen und das Wellenspektrum der Blitzentladung.** [On the propagation of very long electric waves and the wave spectrum of lightning discharges.] *Naturwissenschaften*, Berlin, 39(20):475–476, Oct. 1952. 2 figs. **DWB**—Derives a formula for the radial field strength at the earth's surface in terms of height of ionosphere and distance from transmitter, for different wave-lengths. *Subject Heading:* **1. Sferics.**—*C.E.P.B.*

OBSERVATIONAL DATA

4.7–29 551.506:902(494)

Flohn, Hermann (*D. Wetterdienst, US-Zone*), **Klima und Witterungsablauf in Zürich im 16. Jahrhundert.** [Climate and weather in Zurich in the 16th century.] *Naturforschende Gesellschaft, Zurich, Vierteljahresschrift*, 94:28–41, 1949. 23 refs. Summary in English p. 40. **DLC**—An analysis of meteorological observations made without instruments by W. Haller, 1526–1601. The prevailing temperatures do not differ from those of today. An increasing trend of the severity of winters beginning in 1594 is found; it probably led to the great increase of glaciers about 1601 and 1640. *Subject Headings:* **1. Historic weather records 2. Zurich, Switzerland.**—*A.A.*

4.7–30 551.506.1:551.577(624)

*Anglo-Egyptian Sudan. Meteorological Service, **Annual rainfall statistics (MM.), 1951.** Pub. [1952?] 9 p. entirely tables. Mimeographed. **DWB**—Total rainfall for 433 stations is tabulated for 1950 and 1951, with the average, number of years of average, maximum in one day and date, and number of days with at least 1 or 10 mm for most stations. The stations seem to be arranged by regions, but not alphabetically in each section. There is an apparent

error on the first 3 pages as columns are headed 1951 and 1952, respectively, whereas on the last 6 pages the identical columns are headed 1950 and 1951, respectively. It would seem unlikely that a printed bulletin from the Sudan with total rainfall for 1952 would reach Washington, D. C., on Dec. 19, 1952. *Subject Headings:* **1. Annual meteorological reports 2. Rainfall data 3. Anglo-Egyptian Sudan.**—*M.R.*

4.7–31 551:506.1(673)

*Angola. Servico Meteorológico, **Elementos meteorológicos e climatológicos.** [Climatological and meteorological elements.] First issue received, **1937/1938:** last issue received, **1948.** Luanda, Pub. by the Govt., **1940; 1950.** mostly tables. **DWB**—The annual reports from the Observatório João Capêlo de Luanda contain extensive daily data for Luanda on all elements usually observed at 4 synoptic hours each day (3, 9, 15 and 21 h). Pressure, temperature in a shelter, at the surface of the ground and at depths of 1.5, 0.75, 1.0 and 1.5 m, mean, maximum and minimum vapor pressure and relative humidity, evaporation, rainfall and duration of rain, and wind velocity at the 4 hours, highest, average and total wind, state of sea, amount and type of clouds and visibility at 9, 15 and 21 h and number of hours of sunshine. Pt. II gives the same data, where available, for each month for 6 first order stations and Pt. III less extensive data for 55 climatological stations. Pt. IV rainfall data for 50 precipitation stations. *Subject Headings:* **1. Climatic data 2. Observational data 3. Annual meteorological reports 4. Angola.**—*M.R.*

4.7–32 551.506.1(84)

*Bolivia. Servicio Meteorológico, **Boletin Anual Meteorológico, 1951.** [Annual meteorological bulletin, 1951.] La Paz, **1952.** 66 p. mostly tables. At head of p. 1: Anuario, 1951. **DWB**—Standard meteorological data summarized for 30 synoptic, 45 cooperative (temperature and rainfall), rainfall and 63 evaporation stations in Bolivia. Rough isothermal and isohyetal charts for 1951 are included. *Subject Headings:* **1. Annual meteorological reports 2. Bolivia.** —*M.R.*

4.7–33 551.506.5(269)(04)

Scholes, William Arthur, **Fourteen men; the story of the Antarctic Expedition to Heard Island.** New York, E. P. Dutton, **1952.** 314 p. photos. **DWB**—A popular account of life and weather conditions at an Antarctic Ocean Weather station by the radio operator who was one of the 14 men to establish and occupy the station on Heard Island in 1947–8. The expedition was organized by the Commonwealth (Australian) Government. Three meteorologists: Aub. V. Gotley (forecaster), A. T. Carroll (observer) and Keith W. York (radiosonde operator), besides Alan Martin, Senior Meteorologist and officer in charge, and a marine biologist, geologist, surveyor, 2 physicists and several radio operators constituted the personnel on the expedition. Observations were begun by the meteorologists as soon as the expedition left Melbourne. Observations began on Heard Island in Feb. 1948 and continued until the party was relieved in Jan. 1949. *Subject Headings:* **1. Antarctic expeditions 2. Popular meteorology 3. Heard Island, Indian Ocean.**—*M.R.*

INSTRUMENT CARRIERS

See also: **Cloud droplet electrification in nonprecipitating cumuli** (Gunn), 4.7–42; **Resonance lines in UV spectrum of sun** (Ishizu), 4.7–92.

4.7–34 551.507.361

Knacke, T. W. (*El Centro, Calif.*), **High-altitude parachute recovery.** (In: U. S. School of Aviation Medicine, Randolph Field, Texas, **Physics and medicine of the upper atmosphere.** Albuquerque, **1952.** p. 447–456. figs., 7 refs.) **DLC** –The author examines the inherent characteristics of parachutes that determine their opening process and operational behavior. The discussion includes: the determination of the maximum altitude at which a parachute will open, parachute surface temperature, parachute strength, application range of parachutes and parachute recovery systems and procedures. Table giving diameters of parachutes required for various heights and rates of descent and diagrams of various configuration of air brakes are included. *Subject Headings:* **1. Parachutes 2. Parachute recovery.**—*J.L.D.*

4.7–35 551.507.362

Smith, Charles, P., Jr. (*Naval Res. Lab., Wash., D. C.*), **The physical recovery of instruments and data from a rocket flight.** (In: U. S. School of Aviation Medicine, Randolph Field, Texas, **Physics and medicine of the upper atmosphere.** Albuquerque, **1952.** p. 441 446.) **DLC**—The techniques developed and used to slow the rate of fall of instruments described by the author are: 1) the simple ejection of armored instruments from the rocket before it reaches the denser air, 2) ejection of armored instruments with drag devices attached to them and 3) severance of the tail or nose of the rocket in such a way that both parts become poor aerodynamic forms. A discussion of the protection of instrumentation or record bearing media, techniques of rocket severance, and of methods of impact location using radar, telescopes, meodolites, impact point computer, sound ranging and seismic methods are presented. *Subject Headings:* **1. Rocket instrumentation 2. Rocket descent retardation.**—*I.L.D.*

INSTRUMENTS

See also: **Instruments, techniques for meteorological measurements** (Ference), 4.7–2; **Correlation of sferics and weather phenomena** (Kimpara), 4.7–27.

4.7–36 551.508.765:551.575.1 551.521.61 551.575.1

Kamiyama, K., and Moringuchi, M., **Collection efficiency of fine fibre and infrared spectrometry of fog particles.** *Journal of Meteorological Research*, Tokyo, v. 4, Suppl. Number, March **1952.** p. 43–53. 12 figs., 2 tables. In Japanese, English summary p. 325. **MH-BH**—Using a fiber of artificial resin (radius 2μ), size distributions of fog particles were obtained. These are shown by histograms ($0–35\mu$) to which skew frequency curves are fitted. The infrared ($1.2–1.5\mu$) absorption of fog is discussed and estimated as 14%. *Subject Headings:* **1. Drop size distribution instruments 2. Fog formation 3. Infrared absorption spectrum.**—*C.E.P.B.*

4.7–37 551.508.765

Katz, Isadore (*Johns Hopkins Univ., Silver Spring, Md.*), **A momentum disdrometer for measuring raindrop size from aircraft.** *American Meteorological Society, Bulletin*, 33(9):365–68, Nov. **1952.** 6 figs., 7 refs. **MH-BH**—There exists a need to measure raindrop distributions in storms being investigated by radar. A new air-borne instrument for such measurements has been developed which measures simultaneously the droplet size and the total liquid water. It is primarily a capillary collector inside of which is mounted a condenser microphone to measure the acoustic wave generated by the transfer of energy from the rain drop to the pickup. This device contains a "built-in" calibration system as it measures both the mass (by measuring momentum) and total volume of identical droplets. *Subject Headings:* **1. Disdrometers 2. Raindrop size measurement.**—*Author's abstract.*

4.7–38 551.508.822

Malet, L., **Précision des sondages aérologiques.** [Precision of aerological soundings.] *Belgium. Institut Royal Météorologique, Mémoires*, v. 46, **1951.** 23 p. 8 figs., 4 tables. **OWB**—Experimental comparisons were made during May 1950 at Payerne for six types of radiosondes used in Europe [United States, English, French, Swiss, Finnish and German (US-Zone)]. The author analyzes the nature and range of errors in radiosonde procedures. The results of comparison are presented (in tables and diagrams) for the standard levels 850 mb, 700 mb, 500 mb, 300 mb, 200 mb and 100 mb, which show the degree of dispersion for each type of radiosonde. It is noted that at present the radiosondes show progress in their construction but are not free from errors caused by inertia of receivers, influence of solar radiation, radioelectric transmission, etc. *Subject Headings:* **1. Radiosonde comparisons 2. Upper air soundings.**—*N.T.Z.*

4.7–39 551.508.91:551.510.42

Gast, Th., **Der Staub in der Luft wird gewogen.** [Dust in the air is weighed.] *Umschau*, 53(5):138–139, March 1, **1953.** 3 figs. **DLC**—Describes and illustrates an electric dust separator and an electric micro-balance and recording balance for use with it. *Subject Heading:* **1. Dust meters.**—*C.E.P.B.*

4.7–40 551.508.91

Verzár, F., **Kondensationskernzähler mit automatischer Registrierung.** [Condensation nuclei counter with automatic registration.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 5(3):372–376, **1953.** 3 figs., 7 refs. German, English, French summaries p. 372. **DWB**—A new instrument is described, in which a nucleus counter built on the principle of P. J. Nolan and L. W. Pollak (1946) is adapted to work automatically and record photographically. A specimen record is shown. *Subject Heading:* **1. Nuclei counters.**—*C.E.P.B.*

4.7–41 551.508.94:551.594.12

Fedorov, E. K., **Novyĭ metod issledovaniia ionnogo spektra v atmosfere.** [A new method of investigating ion spectra in the atmosphere.] *Akademiia Nauk, SSSR, Doklady*, 82(5):717–718, Feb. 11, **1952.** fig., ref., 6 eqs. **DLC**—An apparatus to measure the ion current passing through a constant volume of air is described and discussed theoretically. An automatic registration is provided. The ion spectrum can be measured within 2–3 min. *Subject Headings:* **1. Ionization measurement equipment 2. Atmospheric ions.**—*A.A.*

4.7–42 551.508.94:551.507.352 551.594.25

Gunn, Ross, **The electrification of cloud droplets in nonprecipitating cumuli.** *Journal of Meteorology*, 9(6):397–402, Dec. **1952.** 3 figs., 8 refs., 9 eqs. **MH-BH**—A cloud analyzer (centrifuge and ion filter) for use on aircraft is described. This was used to measure charges on cloud droplets in small growing cumuli nearly 4500 ft above MSL. On large cloud drops charge was about $+3.8\times10^{-6}$ e.s.u./cc; on air and tiny drops -6.1×10^{-6}/cc. The balance, 2.3×10^{-6}, is attributed to small drops, diameter .01–10μ. *Subject Headings:* **1. Atmospheric electricity instruments 2. Electricity of precipitation.**—*C.E.P.B.*

4.7–43 551.508.94

von Kilinski, Erich, **Ein Gerät zur Dauerregistrierung des luftelektrischen Vertikalstromes.** [An instrument for continuous registration of the vertical atmospheric electricity current.] *Zeitschrift für Meteorologie*, 6(9):271–277, Sept. **1952.** 7 figs., table, 4 refs., eqs. **MH-BH**—A description with the aid of diagrams of the construction of a device for continuous registration of the vertical atmospheric electricity current. It consists of a receiver, an inductor and an alternating current amplifier. The writing instrument consists of a pen that records the vertical current linearly and with proper sign. A theoretical analysis of the influence of the condenser upon regulation of vertical current is undertaken and a table giving the values of suitable capacities is given. Conductivity, resistance and columnar resistance are determined with the aid of the potential gradient and the measuring place, the oceanic potential gradient and the field disturbance for a ten-day fair weather period are given. *Subject Heading:* **1. Atmospheric electricity instruments.**—*I.L.D.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Marine hydrological forecasts** (Kudriavaia), 4.7-3; **Ocean waves, a meteorological tool** (Munk), 4.7–4.

4.7–44 551.509(436)

†Hoinkes, Herfried, **Probleme der alpinen Synoptik.** [Problems of Alpine synoptics.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 5(3):304–325, **1953.** 2 figs., 215 refs. German, English, French summaries p. 304–305. **DWB**—Synoptic analysis in the Alps is difficult because of the development of local air masses, and of local anticyclonic circulations due to contrast of ice-covered central Alps and warm plains to S and N, diurnal wind systems and irregularity in passage of fronts. Modifications of the general synoptic situation which complicate forecasting include southern föhn, flow of cold air across Alps from wedges to north and lee depressions with development of Vb cyclones. Timing forecasts of heavy precipitation, especially thunderstorms and hail, is difficult because of its relation to local processes. Fog and cloud present problems for aviation. To make full use of local observations (150 stations) a large-scale daily weather map of the Alps is proposed. Much literature is summarized. *Subject Headings:* **1. Weather forecasting 2. Alps.**—*C.E.P.B.*

4.7–45 551.509

Symposium on coordinating meteorological research and weather forecasting. *American Meteorological Society, Bulletin*, 33(9):355–364, Nov. 1952. **MH-BH**—The participants in the symposium were BERNHARD HAURWITZ, HERBERT RIEHL, JULES CHARNEY, ROBERT D. FLETCHER, JOHN HOVDE and WILLIAM J. KOTSCH. They discussed the application of statistical and theoretical studies of forecasting and the utilization of theoretical research in practical forecasting, establishment of experimental forecast groups, the interpretation of theoretical results for the use of practicing forecasters and the Navy's AROWA Project (Applied Research; Operational Weather Analysis). *Subject Headings:* **1. Weather forecasting 2. AROWA Project 3. Symposia.**—*I.L.D.*

4.7–46 551.509:413

World Meteorological Organization, [**Four language glossary**]. *World Meteorological Organization, IMO Publication*, No. 9, Fasc. IV, Weather messages for shipping, Suppl. No. 94, Dec. 24, 1952. 10 p. following A-IV-17-33. In English, French, Spanish and Russian (Cyrillic and Latin characters). **DWB**—This supplement gives a number of terms used in warnings and forecasts. *Subject Headings:* **1. Weather forecasting 2. Glossaries.**—*C.E.P.B.*

4.7–47 551.509.3:551.509.54(794)

*Carr, J. A. (*U. S. Weather Bur., Wash., D. C.*), **Airflow and rainfall in California, December 4–5, 1951.** *Monthly Weather Review*, 79(12):222–225, Dec. 1951. 7 figs., table, ref. **MH-BH**—The synoptic situation connected with extensive rainfall over California and a rapid succession of strong westerlies is analyzed. Precipitation charts and charts showing the surface and 700-mb situation are presented. Two tables contain data on rainfall and on the surface and 700-mb wind directions. *Subject Headings:* **1. Synoptic studies 2. Rainfall forecasting 3. Upper air winds 4. Precipitation charts 5. California.**—*G.T.*

4.7–48 551.509.312:681.1

Berkofsky, Louis (*U. S. Air Force Cambridge Res. Center, Cambridge, Mass.*), **A numerical prediction experiment.** *American Meteorological Society, Bulletin*, 33(7):271–273, Sept. 1952. 3 refs. **MH-BH**—The feasibility of preparing 24-hour forecasts of the 500 mb surface by the use of business machine methods was tested under simulated routine operating conditions. The solution tested is based upon a linearized two-dimensional quasi-barotropic model and a brief description of the procedure is given. A 24-hour forecast was prepared in about 11½ hours and a table giving breakdown of procedures according to elapsed time is given. The possibility of reducing the time needed for a machine forecast to 7 hours is indicated. *Subject Headings:* **1. Numerical forecasting 2. Extended forecasting 3. Computing machines.**—*I.L.D.*

4.7–49 551.509.52:551.555.9

Harry, K. F. and Wright, J. B., **An investigation into the development of the northwest wind at Vancouver.** *Canada. Meteorological Div., Cir.*, 2050, Tec. 107; *Local Forecast Study* No. 15, Dec. 14, 1951. 8 p. 7 figs., ref. **DWB**—A brief study of an interesting local phenomenon: a strong northwest wind, most damaging in the city and district of Vancouver and most difficult to forecast. The strength is often far in excess of gradient wind velocity and occurs often when all neighboring weather stations are reporting little or no wind. The orographic conditions causing this wind are explained, and a synoptic classification with idealized weather maps is given, as an aid for forecasting. *Subject Headings:* **1. Local forecasting 2. Local winds 3. Orographic influences 4. Vancouver, British Columbia.**—*A.A.*

4.7–50 551.509.5:551.515.4(267.5)

El-Fandy, M. G. (*Alexandria Univ., Egypt*), **Forecasting thunderstorms in the Red Sea.** *American Meteorological Society, Bulletin*, 33(8):332–338, Oct. 1952. 5 figs., table, 8 refs. **MH-BH**—The Red Sea is divided into three climatological regions, namely: the Northern Red Sea, north of about 21°N; the Southern Red Sea, south of about 19°N and the Central Red Sea. The climatic characteristics of these regions are described briefly with particular reference to thunderstorm frequency of which the monthly mean for various localities is given

in a table. The formation of thunderstorms is attributed to the establishment of centers of convergence and the development of upper air cyclones. With the aid of streamline charts it is shown that "with the approach of winter, troughs in the upper westerlies extend southward to about lat. 15°N, while troughs in the upper NE–E current of the Sudan still appear and may extend as far north as southern Egypt" and that convergence processes are the main causes of thunderstorms also in the central and northern Sudan, though here the relation between monsoon rainfall and convergence is slight. The northward oscillation of the Sudan Monsoon Low is discussed and a topographic map of the Red Sea area is given. *Subject Headings:* **1. Thunderstorm forecasting 2. Thunderstorm physics 3. Red Sea.**—*I.L.D.*

4.7–51 551.509.54

Schmidt, Reinhart C. (*Wash., Natl. Airport, Wash., D. C.*), **An objective aid in forecasting precipitation at Washington, D. C., during the month of May.** *American Meteorological Society, Bulletin,* 33(6):227–232, June **1952.** fig., table, 2 refs. **MH-BH**—A completely objective method of short range forecasting (12 hours in advance) of precipitation in May at Washington, D. C., independent of knowledge of the occurrence of precipitation elsewhere is proposed. The author describes a simple and objective devices for "integrating: 1) direction and speed of flow, 2) stability and 3) moisture." The "forecast data used are the values of 850-mb and 700-mb temperature, height, and relative humidity for selected raob stations as of 2200E." By means of this method a forecast "score" of 89.7% as compared with 83.3% for the official score for Washington, D. C., was obtained. A scatter diagram of Stability Index vs. Index of Meridional Flow showing the line of separation of rain and no rain cases for both study data and test data years, and a table giving the results of test during May 1951 are included. *Subject Headings:* **1. Precipitation forecasting 2. Washington, D. C.**—*I.L.D.*

4.7–52 551.509.58:551.557.3:656.7

Harley, D. G., **Analysis of equivalent head-winds on the great circle Shannon-Gander, and of errors in forecasts of the same, at London Airport.** *Great Britain. Meteorological Research Committee, M.R.P.,* 749, Sept. 20, **1952.** 10 p. 7 figs., 11 tables. Mimeographed. **DWB**—Equivalent head winds (EHW) are measured from forecast 700 and 500 mb contours; the procedure and sources of error are discussed. The monthly distributions and extremes of actual EHW's and percentage frequency distribution of errors are tabulated and discussed. The mean errors were very small, but standard deviations ranged from 6.5–12.7 knots. Large errors were mainly due to timing of developments. *Subject Headings:* **1. Airways forecasting 2. London Airport.**—*C.E.P.B.*

4.7–53 551.509.58:551.571.3

Legg, Edwin M. (*U. S. Weather Bur., Pomona, Calif.*), **Notes on forecasting the minimum relative humidity in western Washington.** Sept. **1952.** 7 p. 4 charts. Mimeographed. **DWB**—Humidities are much more variable in the western part than in the eastern part of Washington. The air masses alternate between the normal, cool damp stable air of the North Pacific and the occasional, hot dry air masses that characterize summer conditions in the Columbia or Great Basin. On 4–8 days each summer the relative humidity falls to 15% or less, and these are the critical periods for forest fires. Ten parameters were tested for the 168 days of record (at Olympia, Wash.) when minimum relative humidity was 55% or less, and those showing highest correlation further investigated. These were 700 mb winds over W. Washington, lapse rate at Seattle (Sfc to 850 mb) and moisture at 850 mb over Seattle. Scatter diagrams are presented to show how good the correlation is in each case, and a set of rules presented for onset and break up of low humidity situations. *Subject Headings:* **1. Fire weather forecasting 2. Relative humidity forecasting 3. Objective forecasting 4. Western Washington.**—*M.R.*

4.7–54 551.509.9:656.7

Gatineau, A., **Routes aériennes de durée minimum.** [Air routes of minimum duration.] *La Météorologie,* 4th Ser., No. 22:113–127, April–June **1951.** maps, tables. French, English and Spanish summaries p. 113. **DWB**—Actual examples are cited, and flight paths shown

raphically, of flights across various sectors of the North Atlantic (Paris–Gander, Azores-New York, Shannon–Gander, Iceland–New York), and by various routes from Paris to New York, o show how local wind reports (given by pilots, weather ships or shore wind stations) are used n connection with pressure pattern flying, great circle flying, etc. to evaluate the efficiency of hese methods of obtaining the minimum duration flight path. Conclusion is that at present he only advantage to be gained is in the use of reported (by other planes) winds in flight lanning. *Subject Headings:* **1. Minimum flight patterns 2. Brachistochrones 3. Trans-Atlantic air navigation 4. Upper air wind forecasting.**—*M.R.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

STRUCTURE OF THE ATMOSPHERE

See also: **Dust in air weighed** (Gast), 4.7–39; **Far UV solar spectrum of quiet sun as it affects ionosphere** (Wooley), 4.7–98; **Meteoric phenomena and meteorites** (Whipple), 4.7–213; **Characteristics and processes in ionized media** (Bates), 4.7–218; **Average radio wave refraction, lower atmos.** (Schulkin), 4.7–231.

4.7–55 551.510.41:546.264:523.72

*Goldberg, Leo; McMath, Robert R.; Mohler, Orren C. and Pierce, A. Keith (*all Univ. of Michigan, McMath-Hulbert Observatory*), **The abundance of CO in the sun and in the earth's atmosphere.** *Physical Review*, New York, 85(3):481–482, Feb. 1, **1952.** table, 8 refs. **DWB**—CO is concentrated at relatively small optical depths in the solar atmosphere. Table shows a high abundance in comparison with other solar molecules. The localization of CO in the earth's atmosphere is unique. Tracings of the 0–1 CO band suggests a content of 0.5 atmos-cm. Observational results are cited. *Subject Headings:* **1. Carbon monoxide 2. Atmospheric composition 3. Solar atmosphere.**—*W.N.*

4.7–56 551.510.41:546.11:523.47/8

Herzberg, G. (*Ottawa, Canada*), **Spectroscopic evidence of molecular hydrogen in the atmospheres of Uranus and Neptune.** *Astrophysical Journal*, 115(3):337–340, May **1952.** ig., table, 5 refs. **MH-BH**—The unidentified diffuse feature at 8270 A observed by KUIPER n the spectra of Uranus and Neptune is reproduced in the laboratory in an 80-meter path of hydrogen at 100-atm pressure and a temperature of 75°K. It is the S(O) line of the 3–0 pressure-induced rotation-vibration band of the H_2 molecule. Two other lines of this band, as well as three lines of a double transition (2–0, 1–0), are observed in the laboratory spectrum. Most of these features are hidden in the planetary spectra by strong CH_4 bands, but a line 8166 A, of the double transition is only partially overlapped by an adjacent CH_4 band. Its low intensity in the planetary spectra can be accounted for by assuming that there are even larger amounts of helium than of hydrogen in the atmospheres of Uranus and Neptune. Helium does not induce the double transition. The observed spectra are very roughly compatible with a 3:1 (or higher) helium-hydrogen ratio, a temperature of 78°K (or lower), and a partial pressure of hydrogen at the bottom of the visible atmosphere of about 2 atm. The thickness of an equivalent atmosphere of uniform density would be about 18 km for Uranus. *Subject Headings:* **1. Planetary atmospheres 2. Molecular hydrogen 3. Uranus 4. Neptune.** —*Author's abstract.*

4.7–57 551.510.41:523.41

Ringnes, Truls R., **Merkur har atmosfare.** [Mercury has an atmosphere.] *Naturen*, Bergen, 76(4):127, **1952. DLC**—Whether or not Mercury has an atmosphere was never determined until the astronomer A. DOLFUSS, through his studies of polarization of Mercury's light at Pic-du-Midi in southern France, gave definite evidence of its existence. If one assumes that Mercury's atmosphere has the same composition as the earth's, its density is but 0.003 of the earth's atmosphere density or a pressure of about 1 mm mercury. The escape velocity at Mercury's surface is 3.6 km/sec. *Subject Headings:* **1. Planetary atmospheres 2. Mercury.** —*W.N.*

4.7–58 551.510.42

Andreev, P. I., **Sopostavlenie opytnykh i teoreticheskikh kontsentratsiĭ zagriazneniĭ v atmosfere pri nizkikh vybrosakh.** [Comparison of experimental and theoretical concentration of pollutants in the atmosphere in the case of low smoke stacks.] *Gigiena i Sanitariia*, Moscow, 9:17–20, Sept. 1952. 3 eqs. **DLC**—The theoretical formulas which are the integrals for the diffusion equation, for determining the concentration of pollutants from a point source at the surface of the earth in the axis of the gaseous current and the concentration at the surface of the earth in the current from a linear source are given. The calculated concentrations are compared with experimental values and a close correspondence is found. *Subject Heading:* **1. Atmospheric pollution.**—*I.L.D.*

4.7–59 551.510.42

Aujeszky, László, **A légszennyezés meteorológiájának alaptényei.** [Fundamental principles of the meteorological aspects of atmospheric pollution.] *Időjárás*, 56(5/6):157–160, May/June 1952. **DWB**—Summary of an introductory lecture given before the State Air Sanitation Congress of the Hungarian Ministry of Health on April 6, 1952. The author estimates the total amount of pollutants in the atmosphere at several million tons. Effects of air pollution on weather phenomena (such as fog formation) and effects of weather factors (especially wind, rain, and temperature inversion) on the accumulation or dispersion of air pollution are discussed. The self-purification process of air is compared to the same phenomenon in water. Particular attention is paid to air pollution by gaseous substances. *Subject Heading:* **1. Atmospheric pollution.**—*G.T.*

4.7–60 551.510.42:551.584

Bacsó, Nándor, **Makro-, mezo- es mikroklíma adatainak felhasználása a légszennyezés vizsgálataihoz.** [Utilization of macro-, meso- and microclimatic data for the study of atmospheric pollution.] *Időjárás*, 56(5/6):160–163, May/June 1952. **DWB**—The author discriminates between three different types of air pollution: macroclimatic (such as cosmic dust, marine salt, desert sand, etc.), mesoclimatic (like pollen near a field, urban smoke, sand in local storm) and microclimatic (condition of the air in a building, a sick-room, at the base of a chimney, near a highway, etc.). The practical importance of the distinction is that the first type of air pollution is beyond human control, the second can be controlled to a limited extent while the third is entirely within the scope of sanitary measures. In conducting air pollution research the above classification should be borne in mind. The author concludes his lecture (given before a State Air Sanitation Congress, Budapest, April 1952) by emphasizing the necessity of co-operation between the medical and meteorological professions in conducting extensive research on air sanitation. *Subject Headings:* **1. Atmospheric pollution 2. Atmospheric pollution control.**—*G.T.*

4.7–61 551.510.42:551.590.25

Krinov, E. L. and Fonton, S. S., **Obnaruzhenie meteornoĭ pyli na meste padeniia Sikhote-Alinskogo zheleznogo meteoritnogo dozhdia.** [Detection of meteoric dust at the place where the Sikhote-Alinsk iron meteoric rain fell.] *Akademiia Nauk, SSSR, Doklady*, Moscow, 85(6):1227–1230, Aug. 21, 1952. 2 figs., table, 4 refs. **DLC**—Analysis of some portions of the Sikhote-Alinsk meteorite revealed the spraying phenomenon on the surface of meteorite splinters in form of hardened strias, drops, globules, etc. Further investigations were made during the second expedition in 1948, when about 230 specimens were sampled from craters and neighboring regions. Soil specimens, taken from the interior of crater have the highest content of meteoric dust and those from the exterior have the least. The size of dust particles varies from less than 0.25 mm to more than 2.0 mm, being most frequent about 0.5–0.75 mm. The forms of dust precipitation were also different. There are globules, drops, pear shaped drops, strias of spiral form, etc. The absence of fusion marks on the meteoric particles found in the soil shows that this dust is not a product of condensation but has been formed by a splitting process. In conclusion, the authors proposed the three following terms: meteoric dust—for formations in the atmosphere produced by friction and condensation, meteoritic dust—for the products of meteors desintegrating near the earth surface and cosmic dust (incorrectly

lled by Americans—micro-meteorites)—small particles which reached soil surface from the niverse without the influence of high temperatures. *Subject Headings:* **1. Meteorites 2. leteoric dust 3. Sikhote-Alinsk Meteorite (1947).**—*N.T.Z.*

4.7–62 551.510.42:616

Mills, Clarence A. (*Cincinnati Univ.*), **Implications of air pollution in chronic respiratory id cardiac disorders.** *American Meteorological Society, Bulletin*, 33(8):322–325, Oct. **1952.** ble, 12 refs. **MH-BH**—Some of the literature and evidence of the role of air pollution in using and aggravating chronic respiratory and cardiac diseases is reviewed. The Belgian isode of Dec. 1950, that of Donora, Penna. Oct. 1948 and that near Tuxpan on the Gulf of lexico Nov. 24, 1950 are described briefly with particular reference to the fatalities produced, e pollutants involved and the attending atmospheric conditions. The presence of nitric xides and sulfuric acid in the Donora and Belgian disasters was associated with acute irritation id edema in the finer lung air passages and lungs. An analysis of the cardiac and respiratory eaths in Los Angeles on smoggy days is presented. A table showing excess respiratory and rdiac deaths during severe smog periods in Los Angeles County for 1947–1949 is given. *ubject Headings:* **1. Atmospheric pollution 2. Respiratory diseases 3. Heart disease Belgium 5. Donora, Pennsylvania 6. Tuxpan, Mexico.**—*I.L.D.*

4.7–63 551.510.42:634.94

Peace, T. R., **The effect of atmospheric pollution on forest trees in Great Britain.** *Smoke-ss Air*, London, No. 83:12–16, Autumn **1952. DWB**—Damage to trees by air pollution is sually to foliage. Broadleaved trees show discoloration or mottled foliage; conifers also ffer discoloration of needles, but twigs and general growth are injured to a greater degree an in case of broadleaved trees. Within the hardwood groups, sycamore, elm and poplar ow varying degrees of resistance while ash and beech are susceptible. The results of a rvey on the effect of air pollution on the growth of conifers in the South Wales mining district dicate that air pollution is not an important cause of poor growth. Meteorological aspects the study of the effect of air pollution upon forests are discussed. *Subject Headings:* **1. At-ospheric pollution effects 2. Forest damage.**—*I.L.D.*

4.7–64 551.510.42

Shvarts, IA. I. and Zil'berg, L. A., **Zonal'noe issledovanie zagriaznennosti atmosfernogo ozdukha vokrug tolevogo zavoda.** [Zonal investigations of atmospheric pollution around a ue factory.] *Gigiena i Sanitariia*, 7:53-54, July **1952. DLC**—Air samples were taken at vel of 1.5 to 2.5 m above the ground at varying distances from the factory. The distances aried according to the nature of the contaminants tested. Data on the concentration of hydro-rbon, SO_2 and dust at the respective four zones are presented. *Subject Headings:* **1. Atmos-heric pollution 2. Air sampling and analysis.**—*I.L.D.*

4.7–65 551.510.42

Topitz, Alois (*Vienna*), **Über den Wandel der Luftverunreinigung in Wien in der Zeit on 1900 bis 1950.** [The change in atmospheric pollution in Vienna during the period 1900–950.] *Wetter und Leben*, Vienna, 4(5/7):95–102, July **1952.** 2 tables, 9 refs. **MH-BH**—ir pollution by soot and dust has decreased during the last 50 years (improvement of furnaces, hange from coal to gas for domestic heating, change from horse traffic to automobiles). hemical air pollution has increased considerably, especially the content of SO_2, which some-mes reaches dangerous proportions. *Subject Headings:* **1. Atmospheric pollution 2. Vienna, ustria.**—*A.A.*

4.7–66 551.510.42

Venkataramanan, D. (*Geological Survey of India, Manbhum*), **Some aspects of air-pollu-on.** *Science and Culture*, Calcutta, 18(2):69–71, Aug. **1952.** 4 refs. **DWB**—Popular article n sources and effects of air pollution with particular emphasis on pollution by industrial smoke. he author deplores the lack of air pollution control in India and emphasizes the necessity for esearch on smoke abatement and for sanitary regulations similar to those which are in effect other countries. *Subject Headings:* **1. Atmospheric pollution 2. Smoke.**—*G.T.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Zonal wind profile under conditions of constant vorticity** (Grant),4. 7–73; **Radiation and heat economy investigations, Indian Ocean** (Albrecht), 4.7–88; **1. Jet stream bibliography** (Evans), p.

4.7–67 551.5

Fujiwhara, Sakuhei; Syono, S.; Takayama, T.; Yajima, S.; Tamano, M. and Miyabe, N **Quantitative investigation on Okada's law in the behaviour of two vortices.** *Geophysic Magazine*, Tokyo, 22(4):311–322, Aug. **1951.** 3 figs., photos., table. **MH-BH**—There is tendency for two vortexes of the same direction of rotation to approach each other a for two that rotate in different directions to go away from each other after approaching with a certain distance. This phenomenon is called Okada's law. In the present paper the law tested experimentally. It is found that within a certain distance two vortexes rotating in t same direction attract each other with a force proportional to the inverse cube of the distanc *Subject Headings:* **1. Vortexes 2. Experimental hydrodynamics 3. Okada's law.**—*A.A.*

4.7–68 551.5

Jeffreys, Harold (*St. John's College, Cambridge, Eng.*), **The surface elevation in cellul convection.** *Quarterly Journal of Mechanics and Applied Mathematics*, Oxford, 4(3):283–28 Sept. **1951.** 5 refs., 26 eqs. **DWB**—BÉNARD (*Ann. Chim. Phys.* 23(7):62–144, 1901) observe that in cellular convection in a fluid heated below, the surface was depressed over the risi currents. The author's theoretical analysis leads to the opposite result. In order to solve t discrepancy, BÉNARD's experimental work should be repeated. *Subject Heading:* **1. Convecti theory.**—*A.A.*

4.7–69 551.511:551.5

†Monin, A. S., **Izmeneniia davleniia v barotropnoĭ atmosfere.** [Change of pressure barotropic atmosphere.] *Akademiia Nauk, SSR, Izvestiia, Ser. Geofizicheskaia*, No. 4:76–8 **1952.** 3 refs., 51 refs. **DLC**—Author analyzes the velocity field in a polytropic atmosphe introducing a dimensionless equation of motion, computes the horizontal and vertical velocit components, derives a working equation for the pressure change, discusses the theorem of t conservation of potential vorticity and comes to the conclusion that, in the first approxim tion, the pressure change is determined by the transfer of the vorticity of the geostrophic wi along the isobars. The basic equation for pressure change is $\frac{d}{dt}(\Omega-\beta^2\pi)=-(\Omega-\frac{\alpha-1}{\alpha}\beta^2\pi)D$ $\Omega=\frac{\partial v}{\partial x}-\frac{\partial u}{\partial x}$; $D=\frac{\partial u}{\partial x}+\frac{\partial v}{\partial y}$; β—factor, characterizing the possibility of deformation in the hor zontal direction; π—dimensionless value ($\sim$1), characterizing the relative deviation of t surface pressure from the standard pressure; t—time; α—index of polytropy (for the adiabat atmosphere the ratio of heat capacities c_p/c_v). *Subject Headings:* **1. Pressure changes 2. D namics of the atmosphere.**—*A.A.*

4.7–70 551.51

Ogiwara, Sekiji (*Geophysical Inst., Tōhoku Univ.*), **A discussion of "slice method.** *Meteorological Society of Japan, Journal*, 2nd Ser., 30(7):223–230, July **1952.** 2 figs., 4 refs eqs. In Japanese, English summary p. 223. Also: **A discussion of slice method for determi ing the vertical stability of air.** *Tohoku University, Science Reports, 5th Ser., Geophysic* 4(2):71–77, Oct. **1952.** fig., 3 refs. **DWB**—The "slice method" for determining the stabilit or instability conditions of the atmosphere is discussed. It is found that the treatments b J. BJERKNES, S. PETTERSSEN and S. SYONO are not correct. By a dynamical treatment of t problem the author obtained the following results. (1) In the case of non-saturated air an also of saturated air, stability criteria and solenoid-producing energy derived from the parc method hold also for the slice method. (2) In the case of saturated ascent through a dr adiabatically descending environment, stability criteria and solenoid-producing energy a slightly different from those by J. BJERKNES, etc. The force found in the ascending slice M by small displacement Δz_1, is tabulated for various cases and methods. *Subject Heading* **1. Convection 2. Potential energy 3. Stability 4. Slice method.**—*Author's abstract.*

4.7–71 551.511:551.515.2

Scott, J. R., **On the development of horizontal divergence and vorticity in the low latitude nosphere.** *Malaya. Meteorological Service, Memoir*, No. 5, [n.d.] 20 p. 9 figs., 3 refs., eqs. **DWB**—Starting from the equations of motion, four "expressions for the rate of velopment of horizontal divergence and the rate of vorticity development at a moving element air" are derived. "The terms of two of the expressions are discussed with particular reference the equatorial regions and are used together to explain certain features of tropical cyclones. ie other two expressions are used to give reasons for weather development on equatorial es of wind shear." *Subject Headings:* **1. Divergence 2. Vorticity 3. Equations of motion Equatorial meteorology.**—*Author's abstract.*

4.7–72 551.511:551.515

Thompson, P. D., **On the theory of large-scale disturbances in a two-dimensional baro-nic equivalent of the atmosphere.** *Royal Meteorological Society, Quarterly Journal*, 79(339): -69, Jan. 1953. 3 figs., 19 refs., 22 eqs. **DWB**—With numerical forecasting in mind, thor formulates equations of "equivalent-baroclinic" 2-dimensional flow involving only mperature and height of an isobaric surface. "Since those equations form a closed system, ey constitute a mathematically complete theory of the development and movement of large-ale disturbances at the level of equivalence" once they are initiated (but not for the initiation new disturbances). An iterative scheme is proposed which may provide a basis for a new chnique of numerical weather prediction. *Subject Headings:* **1. Dynamics of the atmosphere Atmospheric disturbances.**—*C.E.P.B.*

GENERAL CIRCULATION

See also: **Jan. thaw, New England** (Wahl), 4.7–103.

4.7–73 551.513:551.511

Grant, Alison, **A re-examination of the zonal-wind profile under conditions of constant rticity.** *Journal of Meteorology*, 9(6):439–441, Dec. **1952.** 2 figs., 5 refs., 15 eqs. **MH-BH** The hypothesis of C.-G. Rossby (1947) of constant vorticity throughout a polar cap is placed by one of a limited zone of mixing giving $\omega = (B - \zeta \sin \phi) \cos^2 \phi$, where ω is absolute nal angular velocity and ζ is vertical component of absolute vorticity. Profiles of relative nal velocity are calculated for various values of B and ζ. Comparison with observed wind ofiles suggest $B > \zeta$ as most probable form. *Subject Headings:* **1. Atmospheric circulation Vorticity.**—*C.E.P.B.*

4.7–74 551.513:551.543

Rodewald, Martin, **Das meteorologisch merkwürdige Jahr 1952.** [The meteorologically markable year 1952.] *Annalen der Meteorologie*, 5(3/5):122–129, **1952.** 7 figs., 11 refs. erman and English summaries p. 122. **MH-BH**—Second half of 1925 showed unusual pole ovements associated with abnormal atmospheric circulation north of 20°N and a marked rise sea temperature in NE trade region. On Tenerife warming of air increased upwards. essure anomalies Sept. 1925–Jan. 1926 negative in belt 25°–70°N. There was a marked crease of sunspot numbers and a decrease of solar constant. *Subject Headings:* **1. Pressure omalies 2. Zonal circulation.**—*C.E.P.B.*

4.7–75 551.513.1:551.583(213)

Flohn, Hermann and Hinkelmann, Karl, **Äquatoriale Zirkulationsanomalien und ihre matische Auswirkung.** [Equatorial circulation anomalies and their climatic effect.] *rmany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:114–121, **1952.** 5 tables, refs. English summary p. 114. **DWB**—Relations are studied between: 1) droughts in NE azil and winds at Quixeramobim, 2) El Niño and rainfall in Peru and Ecuador, in relation upper winds and 3) the cause of the equatorial dry zone in the Pacific. These are related to eriodic shifting of the Intertropical Convergence Zone and the Trades and to divergence or nvergence, subsidence or elevation, in equatorial zonal winds. *Subject Headings:* **1. At-ospheric circulation 2. Climatic variations 3. Drought 4. Equatorial meteorology.**—*E.P.B.*

ATMOSPHERIC DISTURBANCES

See also: **Hurricanes; nature and history, particularly of West Indies and S. coast of U. S.** (Tannehill), 4.7–9; **Forecasting thunderstorms, Red Sea** (El Fandy), 4.7–50; **Horizontal divergence and vorticity development in low lat. atmos.** (Scott), 4.7–71; **Theory of large-scale disturbances in 2-dimensional baroclinic equivalent of atmos.** (Thompson), 4.7–72; **Seasonal variation of time of passage of pressure minima** (Sonntag), 4.7–118; **Precipitation and thunderstorms, Salzwedel, 1738–51** (Schöne), 4.7–159; **Typhoon Kezia and sferics** (Kimpara), 4.7–228.

4.7–76 551.515.13(45,4):551.578.1

§Gazzola, Adriano, **Considerazioni sulle situazioni meteorologiche dei giorni 26–27–2 ottobre 1951.** [Remarks on the meteorological situation of October 26, 27, 28, 1951.] *Rivist di Meteorologia Aeronautica*, 12(1):3–21, Jan./March **1952.** 11 figs. Italian, French, Englis and German summaries p. 3. **MH-BH**—Surface and 700 mb synoptic charts, aerologica diagrams and cross sections (Jan Mayen–Italy, Tromsö–Brest and Ireland–France includin Atlantic weather ships) are presented and detailed analysis given of conditions prevailin throughout Europe and especially in Italy on Oct. 26, 27 and 28, 1951 when two cyclones fron the Atlantic invaded Europe from the SW, accompanied by precipitation from clouds a temperatures above 0°C. The phenomenon was attributed to mixing in a shallow but very humid cloud layer. *Subject Headings:* **1. Cyclonic activity 2. Synoptic analysis 3. Rain fron nonfreezing clouds 4. Italy 5. Europe.**—*M.R.*

4.7–77 551.515.2(73

§Ross, R. B. (*U. S. Weather Bureau, Wash., D. C.*), **Hurricane Able, 1952.** *Monthl Weather Review*, 80(8):138–143, Aug. **1952.** 14 figs., table, 5 refs. **MH-BH**—Synoptic study of hurricane in August 1952 with an unusual path, account of damages and information on rainfall amounts associated with the storm. *Subject Headings:* **1. Hurricanes 2. Hurricane Able (1952) 3. United States.**—*A.A.*

4.7–78 551.515.21:551.515.81(265)

Arakawa, Hidetoshi (*Met. Res. Inst., Japan*), **The characteristic structure of the occluded frontal typhoon in the late fall other than the occlusion of wave shaped frontal perturbations.** *Meteorological Society of Japan, Journal, 2nd Ser.*, 30(7):211–216, July **1952.** 2 figs., 3 refs. In Japanese, English summary p. 211. **DWB**—The development of typhoon RUTH is described and illustrated by surface, 700-mb and 500-mb charts for Oct. 14, 15 and 16, 1951. The structure of this typhoon is offered as evidence in support of PALMEN's statement that many cyclones, which appear as occluded fronts on a surface map, have never gone through a real process of occlusion, even if they show a structure comparable to that of genuine occluded polar front perturbations. *Subject Headings:* **1. Typhoon structure 2. Occlusions 3. Frontal perturbations 4. Typhoon Ruth (1951) 5. Pacific Ocean. I. Palmén, E. H.**—*G.T.*

4.7–79 551.515.21:551.515.23(691)

§Emon, Jean, **Exemples de cyclones tropicaux mort-nés à Madagascar.** [Examples of abortive tropical cyclones originating in Madagascar.] *Madagascar. Service Météorologique, Publication*, No. 7, July, **1946.** 33 p. charts. **DWB**—In the intertropical convergence zone of the Indian Ocean these disturbances, which often appear on the weather charts, develop to varying degrees—some become full fledged hurricanes, some poorly developed hurricanes and some die out without ever reaching the hurricane stage. The latter are called tropical cyclones "born dead" or undeveloped. Three examples of such abortive cyclones are analyzed and described in full: one on March 5, 1946, one on March 5, 1940 and one on March 12, 1943—all in the neighborhood of Madagascar. Barograph traces and surface synoptic charts are appended for each case. Local peculiarities of the island of Madagascar, which inhibit or favor development of such cyclones, are discussed. *Subject Headings:* **1. Tropical cyclones 2. Hurricane formation 3. Madagascar.**—*M.R.*

4.7–80 551.515.21(265/6)

Hughes, Lawrence A., **On the low-level wind structure of tropical storms.** *Journal of Meteorology*, 9(6):422–428, Dec. **1952.** 10 figs., table, 10 refs. **MH-BH**—Eighty-four

reconnaissance flights into 28 Pacific tropical storms at about 1000 ft were analyzed, including 5 in a stationary storm. Composite isolines show tangential velocity, trajectories relative to center, radial velocity, divergence and vertical motion, and average rainfall give a value of 436×10^{22} ergs/day in a 3° radius. *Subject Headings:* **1. Hurricane structure 2. Pacific Ocean.** —*C.E.P.B.*

4.7–81 551.515.21(52)

§Masuda, Y. and Takeuchi, M., **An aerological investigation of the structure of the typhoon.** *Papers in Meteorology and Geophysics*, Tokyo, 2(3–4):234–262, Dec. **1951.** 25 figs., 20 refs. **MH-BH**—A comprehensive synoptic study of two typhoons from the dynamical point of view. Actual and potential temperature isopleths and cross sections are given for different aerological stations. It is found that a typhoon is not a simple convective system, but is superposed by several secondary convective dynamical systems. *Subject Headings:* **1. Typhoon structure 2. Synoptic studies 3. Japan.**—*A.A.*

4.7–82 551.515.21

Seilkopf, Heinrich, **Zur Entstehung tropischer Wirbelstürme.** [On the origin of tropical hurricanes.] *Annalen der Meteorologie*, 5(3/5):130–140, **1952.** 6 figs., 19 refs. German and English summaries p. 130. **MH-BH**—In Aug.–Oct. E winds normally blow up to 12 km over Fernando Noronha, but before W. Indian hurricanes these change to S–SW, indicating a quasistationary trough off S. America. From this a cyclonic high-level vortex crosses the equator without change of rotation, becoming anticyclonic over the Antilles. Author thinks this may contribute to formation of hurricanes. Schematic world charts of cyclone tracks in summer and autumn, and quasistationary troughs at the same time in the other hemisphere (shown as extending temporarily to the equator) show a coordination supporting this theory. *Subject Heading:* **1. Hurricane theory.**—*C.E.P.B.*

4.7–83 551.515.22

Uwai, K. (*Central Met. Obs., Tokyo*), **On the movement of rainfall-group (IV). (Analysis of the rainfall-groups by the typhoons "Kezia" and "Jane").** *Meteorological Society of Japan, Journal, 2nd Ser.*, 30(8):241–254, Aug. **1952.** 10 figs., 14 refs., 6 eqs. In Japanese, English summary p. 241–242. **DWB**—Displacement of rainfall groups connected with the two typhoons (Sept. 1950) is analyzed from charts. A chart of isochrones of rainfall groups is presented. Distribution of vorticity is calculated by an equation developed by Syoono. The results are in good agreement with conclusions drawn from the distribution of rainfall groups. Curves showing the intensity of rainfall in the different groups as a function of time measured from the formation of the group are also presented and discussed. (For Pt. I *see item* 2.4–131, April 1951, for Pt. III, *item* 3.4–202, April 1952, *MAB*). *Subject Headings:* **1. Typhoon "Kezia" (Sept. 1950) 2. Typhoon "Jane" (Sept. 1950) 3. Rain intensities 4. Japan.**—*G.T.*

4.7–84 551.515.22

Watanabe, K. (Central Met. Obs., Tokyo), **Some studies on the mechanism of typhoon (Part II. Pressure).** *Meteorological Society of Japan, Journal, 2nd Ser.*, 30(4):126–131, April **1952.** 10 figs., 2 tables, ref. **MH-BH**—Pressure characteristics of typhoons observed from 1949 to 1951, by aerial means and from land or sea, are investigated. Typhoons are classified by minima of center pressures into four groups which also represent differences in the mechanism of their development. The formation of typhoons through all stages of maturity and decay and the rate of their development are thoroughly discussed and illustrated. (For Pt. I *see item* 3.10–124, Oct. 1952, *MAB*.) *Subject Headings:* **1. Typhoon mechanics 2. Atmospheric pressure.**—*G.T.*

4.7–85 551.515.23

Cressman, George P. (*Hq. Air Weather Serv., Wash., D. C.*), **Northward acceleration of typhoons.** *American Meteorological Society, Bulletin*, 33(6):243, June **1952.** 4 refs. **MH-BH**—Since the net pressure force acts on a vortex which is almost equal to one half the resultant of the Coriolis force and is oppositely directed (in contrast to Rossby's statement that the

total northward force on a vortex is the resultant of the Coriolis force), and since the low level circulation of typhoons is much more symmetrical than previously supposed, the author recalculates the accelerations determined in a previous article (*see item* 3.5–163, May 1952, *MAB*). "The resulting accelerations, for example 1, 2 and 3 should be, respectively, ½, 2 and 8½ knots per day." *Subject Headings:* **1. Typhoon tracks 2. Coriolis force.**—*I.L.D.*

4.7–86 551.515.23

Gentry, Robert C. (*U. S. Weather Bur., Miami, Fla.*), **Note concerning northward force acting on hurricanes.** *American Meteorological Society, Bulletin*, 33(8):321, 325, 331, Oct. **1952.** Reply by G. P. Cressman, p. 331, 338. 4 refs. **MH-BH**—The author maintains that CRESSMAN (*see item* 3.5–163, May 1952, *MAB*) overestimated the size of the northward force F in the typhoon "Doris." CRESSMAN used ROSSBY's assumption that the speed is everywhere constant on any radius from the center and failed to average the magnitude of F over the full depth of the circulation. Since F is much weaker than CRESSMAN reasoned, "Doris" moved northward by the steering of the upper winds. CRESSMAN replies that as there appears to be little change to the radial velocity profile through the layer from 1500 ft above sea level to 700 mb surface, it is the variation of Coriolis force with latitude that causes northward movement. The role of steering is questioned. *Subject Headings:* **1. Typhoon tracks 2. Typhoon "Doris" (1950) 3. Coriolis force. I. Cressman, George P.**—*I.L.D.*

4.7–87 551.515.23

Hurricane hunters. *The Lamp*, New York, 34(3):15–17, Sept. **1952.** illus. **DWB**—The 53rd Air Reconnaissance Squadron, based at Miami, is the subject of a vivid narration in which the squadron's activities in exploring a hurricane from Sept. 11 to Sept. 18, 1952 are described to some detail. The development of the hurricane itself is also dramatically depicted. A sample radarscope photograph showing the eye of a hurricane is presented. *Subject Headings:* **1. Hurricane tracking 2. Radar storm detection 3. Airplane weather reconnaissance.** —*G.T.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Infrared spectroscopy of fog particles** (Kamiyama, Moringuchi), 4.7–36; **Twilight phenomena on earth in general** (Sato), 4.7–215.

4.7–88 551.521:551.511

Albrecht, Fritz, **Strahlungs- und Wärmehaushaltsuntersuchungen während einer Seereise durch den Indischen Ozean im Juni 1949.** [Radiation and heat balance investigations during a sea voyage through the Indian Ocean in June 1949.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:5–10, **1952.** 2 figs., 4 tables, 15 refs. German and English summaries p. 5. **DWB**—Measurements of solar, global and effective outgoing radiation in the Indian Ocean in June 1949 are tabulated and the radiation balance calculated. From the ordinary ship's observations the components of the heat and water balance are calculated. *Subject Headings:* **1. Radiation balance 2. Heat and moisture balance 3. Indian Ocean.**—*C.E.P.B.*

4.7–89 551.521

Bernhardt, Fritz, **Die sekundär-diffuse Strahlung in einer Rayleigh-Atmosphäre.** [Secondary diffuse radiation in a Rayleigh atmosphere.] *Zeitschrift für Meteorologie*, 6(9):257–271, Sept. **1952.** 9 figs., 7 tables, 4 refs. **MH-BH**—A formula for calculating numerically the secondary scattering in a Rayleigh atmosphere is developed. The polarization of the primary scattered radiation is neglected since its consideration would complicate the computation. On the assumption that the calculated relationships between secondary and primary radiation hold also for multiple scattering, a comparison is made between the sky radiation calculated for z (zenith distance) $=0$, and the measurements extrapolated by G. REITZ for the turbidity factor $I=1$. A much higher agreement with the measurements is obtained where multiple scattering is included than when primary scattering alone is considered. The radia-

ion densities of individual sky zones are calculated for three different wave lengths and the otal light. *Subject Heading:* **1. Secondary scattering.**—(*Trans. of author's abstract*).—*I.L.D.*

4.7–90 551.521:633.61

García Baylleres, José L., **Influencia de las radiaciones en la cana de azúcar.** [Influence f radiation on sugarcane.] *Academia Nacional de Ciencias, Mexico City, Memorias y Revista,* 7(1/2):107, **1952. DWB**—Qualitative discussion of the chemical and biological effect of arious wave lengths of light on cells, chromosomes, growth and yield of different varieties of ugarcane. *Subject Headings:* **1. Radiation effects 2. Sugarcane.**—*M.R.*

4.7–91 551.521.63551.521.7

Burnight, T. Robert (*Naval Res. Lab., Wash., D. C.*), **Ultraviolet radiation and X-rays of olar origin.** (In: U. S. School of Aviation Medicine, Randolph Field, Texas, **Physics and nedicine of the upper atmosphere.** Albuquerque, **1952.** p. 226–238. figs., tables, 20 refs.) **DLC**—A review of some of the experimental data on measured intensities in various wave ength intervals and the altitudes to which these radiations penetrate, that have been obtained by using rockets. The author discusses the general transmission characteristics of the atnosphere at various altitudes from 0 to about 140 km, the ultraviolet spectra in the wave ength interval 3800 to 2000 Å; radiation at wave lengths shorter than 2000 Å as revealed by arious techniques such as the use of thermoluminescent phosphor, photon counters and photoemission phenomena; and the intensities of the soft X-radiation in the interval 0 to 30 Å. *Subject Headings:* **1. Ultraviolet radiation 2. X-radiation.**—*I.L.D.*

4.7–92 551.521.63:535.33:551.507.362

Ishizu, Taichiro (*Kyoto Univ.*), **Note on some resonance lines in the ultraviolet spectrum f the sun.** *Astronomical Society of Japan, Tokyo, Publications,* 2(3):133–136, **1951.** fig., able, 8 refs., 10 eqs. **DLC**—Using information obtained in V-2 rocket flight in which measurenent of the solar spectrum was extended to the formerly inaccessible region of about 2100 Å, he author discusses features of Mg lines in connection with intensity of line center and wing part, optical thickness, emission reversal and anomalies. He extends his analysis to the Si_{II} ine which has not yet been observed but properties of which can be predicted on the basis f expected similarities. *Subject Headings:* **1. Ultraviolet spectrum 2. Rocket data.**—*G.T.*

4.7–93 551.521.63

Leistner, Walter, **Der tägliche Gang der langwelligen und mittelwelligen Ultravioletttrahlung in Abhängigkeit von der Bewölkung in Wyk auf Föhr.** [The diurnal variation of ong and medium-wave UV radiation in relation to cloudiness at Wyk on Föhr.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte,* No. 42:20–23, **1952.** 5 figs., 8 refs. **DWB**—Curves of diurnal variation of total, sky and solar UV radiation in bands 400–320, 320–280 nd below 280 mμ are given for cloudless days and days with different amounts and type of cloud. *Subject Headings:* **1. Ultraviolet radiation 2. Wyk on Föhr, Germany.**—*C.E.P.B.*

4.7–94 551.521.63:016

†Rosenbaum, E. J. (*Sun Oil Co., Norwood, Pa.*), **Ultraviolet absorption spectroscopy.** *Analytical Chemistry,* Wash., D. C., 24(1):14–16, Jan. **1952.** 61 refs. **DLC**—The 61 references re listed alphabetically by author and referred to by corresponding numbers in the discussion nder the 4 main subject headings: (1) apparatus and general topics, (2) biological and pharnaceutical applications, (3) inorganic and (4) organic analysis in the form of brief annotations. Single reprints available from American Chemical Society, Reprint Dept. Price: $1.50. *Subject Heading:* **1. Ultraviolet absorption bibliographies.**—*W.N.*

4.7–95 551.521.63:535.33

Tanaka, Yoshio (*Tokyo Univ. Inst. for Optical Res.*) and Sai, Tokoku, **The emission bands f nitrogen oxide in the extreme ultraviolet region.** *Tokyo. Univ. of Education. Institute for Optical Research, Science of Light,* 1(2):85–92, Oct. **1951.** 8 figs., 14 tables, plate. In Japanese, English summary append. p. 8. **DWB**—A vacuum spectrograph with 1—m concave grating was used in measuring emission spectra of NO which were analyzed from 1450 Å to

2200 Å. The authors succeeded in differentiating the γ and ϵ systems which were formerly considered to be indistinguishable due to overlap. In addition, some new systems were discovered and found to coincide with some absorption bands recently identified by TANAKA, SEYA and MORI (*see item* 4.7–96 below). The instrument used is described and shown in diagrams. Data obtained for the various systems are presented in tabular and graphical form and a spectrophotograph is reproduced. *Subject Headings:* **1. Ultraviolet spectrum 2. Nitrogen bands 3. Emission spectra.**—*G.T.*

4.7–96 551.521.63:535.34

Tanaka, Yoshio, Seya, Masao and Mori, Kazuo, **On the absorption spectra of nitrogen oxide in the extreme ultraviolet region.** *Tokyo. Univ. of Education, Institute for Optical Research, Science of Light*, 1(2):80–84, Oct. **1951.** figs., refs. In Japanese, English summary append. p. 8. **DWB**—Absorption spectra of NO in the extreme UV region were photographed and analyzed. Two vacuum spectrographs containing 1-m and 3-m concave grating, respectively, were used. Results of the measurements are presented in tabular form and the spectrophotographs reproduced. Few intensity anomalies were found in the β-bands and it is therefore believed that the probability of predissociation is very small. A calculation of the dissociation energy of the upper portion of γ-bands led to values much lower than those formerly assumed. It is pointed out that many important absorption bands still remain to be classified. *Subject Headings:* **1. Ultraviolet spectrum 2. Nitrogen bands 3. Absorption spectra.**—*G.T.*

4.7–97 551.521.63/4:551.587.6

U. S. Corps of Engineers and U. S. Weather Bureau, **Transmission of short-wave radiation through forest canopy.** *U. S. Corps of Engineers. Cooperative Snow Investigations, Research Note*, Oct. 15, **1951.** 12 p. 5 figs., 3 tables, 4 refs. **DWB** –Radiation data obtained with pyrheliometers, light meters and vertical photographs by the Upper Columbia Snow Laboratory in 1947 are analyzed in reply to this question: "To what extent of accuracy may radiation through trees be estimated when an index of forest canopy is known?" It is tentatively concluded that: 1) average proportion of incident radiation—fairly satisfactory, 2) day-by-day variability —fairly satisfactory, 3) percentage transmission increases with cloud cover, 4) on cloudy days, the incident radiation data are more effectively obtained by the light meter than by the pyrheliometer and 5) percentage transmission is significantly correlated (positive correlation) with insolation in the open. *Subject Headings:* **1. Forest influences 2. Short wave radiation 3. Insolation. I. Upper Columbia Snow Laboratory.**—*W.N.*

4.7–98 551.521.63:551.510.535

Wooley, R. (*Commonwealth Obs., Canberra, Australia*), **The far ultraviolet solar spectrum of the quiet sun as it affects the ionosphere.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 11:273–282, **1952.** 2 figs., 4 tables, 8 refs., 9 tables, 9 eqs. **DWB**—A resumé of work by the author and C. W. ALLEN on the zero activity of the sun to a stage where an emission spectrum may be calculated. *Subject Headings:* **1. Ultraviolet radiation 2. Ionosphere. I. Allen, C. W.**—*W.N.*

TEMPERATURE

See also: **Winter temp. field with variable exchange coefficient over oceans and seas** (Shuleĭkin), 4.7–7; **Radar echoes at vertical incidence from horizontally stratified atmos.** (Browne), 4.7–22; **Thermal influence on diurnal pressure wave** (Spar), 4.7–116; **Diurnal air and ground temp. change on fog day** (Yoshida), 4.7–149; **Temp. distribution and surface covers** (Sekiguti), 4.7–188.

4.7–99 551.524

*Hesse, W. (*Geophysikal. Inst. Leipzig*), **Nachwinter in Nordwestsachsen.** [Late winter in NW Saxony.] *Zeitschrift für Meteorologie*, 6(8):237–244, Aug. **1952.** 3 figs., 6 tables, 15 refs. **MH-BH**—Causes of late winter in northwest Saxony were investigated from the 101-year temperature record of Leipzig. A definition of late winter is given and frequency, duration, intensity and precipitation tendency of late winters investigated. Late blooming

of early plants pointed out. Finally, general synoptic situations accompanying and meteorological conditions preceding late winters are summed up. During the 101-year observation period late winters occurred in 29 years. The longest late winter lasted 20 days, the coldest one had an average negative temperature anomaly of 7°. During the late winter periods, accumulated negative temperatures from 75° to less than 1° occurred. Late winters are always caused by cold-air advection, never by radiation frost alone. In 75–80% of all cases a long or severe late winter in northwest Saxony is preceded by a warm winter. *Subject Headings:* **1. Cold springs 2. Long period records 3. Saxony, Germany.**—(*Trans. of author's abstract.*)

4.7–100 551.524.1:551.584.4

Daigo, Y. and Maruyama, Y., **On the relation between the air temperature in the observation field and barley field.** *Journal of Agricultural Meteorology*, Tokyo, 6(3/4):165–166, Aug. **1951.** 2 figs. In Japanese, English summary p. 166. **DWB**—Statistical study carried out at the experiment station field of the branch of Industrial Meteorology at Owada-cho, Saitarna Prefecture. Temperature at 10 a.m. from Feb.–June at a given height over bare ground (x) plotted against that at the same height in a barley field (y) and a series of regression lines drawn for average, clear, cloudy or rainy day 10 a.m., maximum, minimum and diurnal range. Formulas also given for these lines. Results show higher air temperature in barley field (except for minimum) and daily range was much higher in barley field than in the open field. *Subject Headings:* **1. Diurnal temperature variations 2. Vegetation influences.**—*M.R.*

4.7–101 551.524.2:551.581

Hess, Seymour L. and Frank, Robert M. (*Florida Univ.*), **A theory of the temporal and latitudinal distribution of temperature.** Florida. State Univ., Dept. of Meteorology, Contract Nonr-158(00), Technical Report No. 19, June 15, **1952.** 19 p. 5 figs., 14 eqs., 8 refs. Also in: *Journal of Meteorology*, 10(2): 135–142, April **1953. DWB**—The surface temperature of various latitudinal circles throughout the year is expressed as a function of absorbed and emitted radiation and of meridional heat transport through eddy exchange. Theoretical curves drawn and compared to actual temperature measurements. Discrepancies between these two are attributed to factors neglected in the theory, such as varying conditions of the surface, effect of phase transitions of water substance, etc. It is noted that a time lag of one day exists between maximum or minimum values of temperature at the poles and at 20° latitude, as a result of introducing the meridional heat transport factor. *Subject Headings:* **1. Temperature distribution 2. Radiation effects 3. Heat transfer 4. Eddy flux. I. Florida. University. Dept. of Meteorology. II. Contract Nonr-158(00).**—*G.T.*

4.7–102 551.524.3:551.553(213)

Conrad, Victor, **Temperature, wind direction and speed in the tropics.** *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:3–5, **1952.** 3 tables, 5 refs. German summary p. 3. **DWB**—Observations of wind direction and speed, and their effect on temperature at midnight at Batavia, Java, suggest that in tropics as in temperate regions a secondary periodic wind system may cause small periodic temperature variations. This is attributed to turbulent heat exchange in the vertical. *Subject Headings:* **1. Temperature variations 2. Wind variations 3. Batavia, Java.**—*C.E.P.B.*

4.7–103 551.524.3(434.6)

*von Rudloff, Hans, **Die Tagesmitteltemperaturen von Karlsruhe 1871 bis 1950.** [The daily mean temperatures of Karlsruhe, 1871–1950.] *Meteorologische Rundschau*, 5(9/10):175–181, Sept./Oct. **1952.** 7 tables, 12 refs. **DWB**—Extensive tables give for each day: mean daily temperature (also 5-day means), highest and lowest daily means, mean departures of daily from 31-day smoothed means, frequencies of + departures, and differences of daily means, 1871–1910 from 1911–50 (showing marked warming at mid-winter). *Subject Headings:* **1. Temperature variations 2. Long period records 3. Karlsruhe, Germany.**—*C.E.P.B.*

4.7–104 551.524.31:551.525

Yoshida, Z. (*Inst. of Low Temp. Sc., Hokkaido Univ.*), **On the diurnal variation of air- and ground-temperature on a clear day.** *Geophysical Magazine*, Tokyo, 23(4):415–422,

May 1952. 3 figs., 15 eqs. **MH-BH**—From the heat balance equation $L+B+W=I$ (L—radiation energy transferred to the air by eddy conduction, B—downward flow into the ground by conduction, W—radiation energy spent for evaporation of water and I—radiation energy of sun absorbed by the ground) the author derives theoretical equations in which air temperature near the ground and temperature of the ground surface are deduced as functions of time. Thermal constants of air and ground and ground surface temperature at sunrise are used. Equations are devised for the case of still air and for air that moves inland from the sea. *Subject Headings:* **1. Diurnal temperature variations 2. Diurnal soil temperature variations 3. Soil-air heat exchange.**—*I.L.D.*

4.7–105 551.524.32:551.584.2

Boer, W., **Über den Einfluss des Lokalklimas auf die Mitteltemperatur. I. Vergleich der Temperaturen in Kaltennordheim und Kalteneber (Kessellage und Hochflächenlage).** [On the influence of local climate on mean temperature. I. Comparison of temperature in Kaltennordheim and Kalteneber (valley and plateau sites).] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte,* No. 42:217–220, **1952.** 2 figs., 7 tables, 5 refs. **DWB**—Kaltennordheim (Saxe-Weimar) is in a broad valley at a height of 456 m, Kalteneber in Upper Eichsfeld (Prussia) 65 km to N is on a slight pleateau of 445 m. Frequencies of temperature differences between them are tabulated and discussed. *Subject Headings:* **1. Seasonal temperature variations 2. Local climates 3. Germany.**—*C.E.P.B.*

4.7–106 551.524.32:551.513(74)

Wahl, Eberhard W. (*Geophysics Res. Directorate, Cambridge, Mass.*), **The January thaw in New England. (An example of a weather singularity.)** *American Meteorological Society, Bulletin,* 33(9):380–386, Nov. **1952.** 7 figs., 6 refs. **MH-BH**—An analysis of the temperature record of the period 1873–1952 for Boston, Mass., indicates the definite existence of a marked Jan. thaw in New England. The probabilities that this singularity is due to chance are tested by the t-test of Student and confidence limits; the former show a probability of coexistence of two daily normals in a random series of only 7% and the latter surpasses 95%. Other weather records (Wash., D. C., New York, Columbia, Mo., etc.) show similar temperature anomalies at the date of the thaw and a characteristic change in the circulation pattern. Frequency distribution of daily average temperature at Boston for four selected days (Jan. 13, 22, 29 and Feb. 5) and show a secondary maximum on Jan. 22 and 29. Evidence is presented showing that the Jan. thaw is a part of the general change over from a westerly circulation pattern to a NW flow pattern. *Subject Headings:* **1. Temperature singularities 2. January thaw 3. Atmospheric circulation 4. New England.**—*I.L.D.*

4.7–107 551.524.35

Aniol, Rudolf, **Eine Statistik stärkerer Temperaturrückgänge im Sommer.** [Statistics of sharp temperature falls in summer.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte,* No. 42:50–53, **1952.** fig., 6 tables, 4 refs. **DWB**—The frequencies of different interdiurnal variabilities of temperature and frequency and duration of temperature falls of 3°/day or 4½°/2 days are tabulated for Cleve and Augsburg. *Subject Headings:* **1. Temperature waves 2. Cleve, Germany 3. Augsburg, Germany.**—*C.E.P.B.*

SOIL TEMPERATURES

See also: **Diurnal variation of air and ground temp. on clear day** (Yoshida), 4.7–104; **Diurnal air and ground temp. change on fog day** (Yoshida), 4.7–149.

4.7–108 551.525.4

Lehmann, Paul, **Raumeinteilung der klimagebundenen Lithosphäre.** [Spatial distribution of the climatically influenced lithosphere.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte,* No. 42:274–276, **1952.** 3 figs., 6 refs. **DWB**—The soil climate structure is compared to that of atmosphere, with a ground layer, heat accumulation layer, ground stratosphere and deep layer—exosphere. This is illustrated by earth temperature profile to 12 m at Treves. *Subject Headings:* **1. Underground temperatures 2. Treves, Germany.**—*C.E.P.B.*

4.7–109 551.525.4:551.461

Revelle, Roger and Maxwell, Arthur E.; Bullard, E. C., **Heat flow through the floor of the Eastern North Pacific Ocean.** *Nature*, London, 170(4318):199–200, Aug. 2, **1952.** table, 7 refs. **DWB**—Description of instrument for measuring heat flow between 81½ and 24 in. below sea bottom. At depths of 4–5 km flow was $0.9–1.3\times10^{-2}$ cal/cm²/sec. *Subject Heading:* **1. Ocean floor temperatures.**—*C.E.P.B.*

4.7–110 551.525.4

Suzuki, S., **The conduction of heat in a paddy field soil.** *Journal of Agricultural Meteorology*, Tokyo, 7(1):11–12, Dec. **1951.** In English and Japanese. table, eqs. **DWB**—The thermal conductivity of the soil with a thin layer of water on its surface and water leaking through it is mathematically determined. Results obtained through the application of the equations presented are compared with experimental data. *Subject Headings:* **1. Heat conductivity of soil 2. Rice.**—*G.T.*

4.7–111 551.525.5:551.588.6

Benninghoff, William S., **Interaction of vegetation and soil frost phenomena.** *Arctic*, Montreal, 5(1):34–44, March **1952.** 5 figs., refs. **MH-BH**—On the basis of many investigations made before in different permafrost areas, the author discusses the influence of soil frost on plants and vice versa. Permafrost produces specific climatic conditions for vegetation and decreases duration of growing season. Frozen soil injures and deforms the root systems of trees, and limits the penetration of roots into soil; it disrupts the anchoring function of roots, so that trees can then be easily overturned by storms. Frost in soil also hinders the downward percolation of water and increases the moisture near the soil surface. Soil freezing and thawing have different intensities for bare soils and soils covered by vegetation, depending on heat exchange, moisture, snow cover, etc. It was found that thawing extends deeper in bare soil and the level of permafrost is highest under a surface covered with forest. Plant roots and underground stems have certain mechanical roles in the genesis of soil frost. In conclusion, the author proposes that geologists, botanists and soil scientists, should continue investigations for application to Alaskan economy, where permafrost areas occur in more than half the territory. *Subject Headings:* **1. Permafrost 2. Freezing soil effects 3. Vegetation influences 4. Alaska 5. Arctic.**—*N.T.Z.*

SEA TEMPERATURES

See also: **Ecology of Pelmatohydra oligactis, Kirkpatricks Lake, Tenn.** (Bryden), 4.7–164.

4.7–112 551.526.8(436)

*Eckel, O., **Mittel- und Extremtemperaturen des Hallstättersees.** [Mean and extreme temperatures in Hallstätter Lake.] *Wetter und Leben*, 4(5/7):87–93, July **1952.** fig., 2 tables, 5 refs. **MH-BH**—Mean and extreme temperature data are given for the period 1922–1950 arranged by decades from the surface to a depth of 100 m and mean monthly surface data for the period 1901–50. The results are compared with Lunzer Untersee. *Subject Headings:* **1. Lake temperatures 2. Hallstätter Lake, Austria.**—*A.A.*

4.7–113 551.526.8:551.311.18:627.4

Farrow, Richard C. (*Victoria, B. C.*), **Frazil and anchor ice.** *Western Snow Conference, Proceedings, 17th Annual Meeting*, **1949.** p. 29–31. 2 refs. **DWB**—Frazil ice is caused by turbulence preventing ice needles from coalescing to form a sheet. Slush ice is caused by heavy snowfall over open water which is below 32°F; it may or may not be mixed with frazil ice. Slush ice does not clog gages, but frazil ice reforms into sheets and interferes with gaging as well as hydroelectric installations. Best conditions are when a solid sheet of ice covers the water surface. Anchor ice may form 2 in. deep on boulders or bed of channel—never forms when ice sheet covers water, and usually forms on clear nights. On sunny days the anchor ice breaks loose and floats downstream interfering with operations. *Subject Headings:* **1. Frazil ice 2. Anchor ice 3. River gages 4. Ice damage 5. Definitions.**—*M.R.*

4.7–114 551.526.8:551.311.183

Gerdel, Robert W. and Schaefer, Vincent J., **Discussion of "The formation of frazil and anchor ice in cold water" by Vincent J. Schaefer.** *American Geophysical Union, Transactions*,

33(1):127–128, Feb. **1952.** 7 refs. **DWB**—Anchor ice cannot be formed by long wave radiation loss from submerged objects. The work of ALTBERG, BYDIN, DEVIK and others in this field is mentioned. (*See also* 2.4–152, April 1951, *MAB.*) *Subject Headings:* **1. Frazil ice 2. Anchor ice.**—*A.A.*

PRESSURE AND WIND

PRESSURE

See also: **Autocorrelation of daily sea level pressure, N. Hemisphere** (Schumann, Van Rooy), 4.7-6; **Pressure change in barotropic atmos.** (Monin), 4.7–69; **Meteorologically remarkable year 1952** (Rodewald), 4.7–74.

4.7–115 551.543.1

Chiu, Wan-cheng, **On the oscillations of the atmosphere.** *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 5(3):280–303, **1953.** 4 tables, 12 refs., 71 eqs. English, German, French summaries p. 280–281. **DWB**—The effect of a zonal wind of constant angular velocity is introduced into the resonance theory of the 12-hr pressure wave, assuming an incompressible autobarotropic atmosphere. If the angular velocity of zonal wind is α, ω that of earth's rotation, and equivalent height 8 km, the period of the wave propagating in the same direction as the semidiurnal pressure variation is 11.94 hrs for $\alpha = \omega/33$ (10 m/sec in 45° lat) and 11.92 hrs for $\alpha = 2\omega/33$. The effect of variations of lapse rate is also found to be small. This supports the resonance theory. *Subject Heading:* **1. Semidiurnal pressure waves.**—*C.E.P.B.*

4.7–116 551.524.31:551.543.1

Spar, Jerome (*N. Y. Univ., Dept. of Met. and Ocean.*), **Thermal influence in the diurnal pressure wave.** *American Meteorological Society, Bulletin*, 33(8):339–342, Oct. **1952.** 5 figs., 4 tables, 5 refs. **MH-BH**—The conclusions on the thermal component in the diurnal pressure wave of KELVIN, CHAPMAN and WILKES are summarized using thermograph and barograph traces from New York University weather station for April–Aug. and Dec.–March 1948–1951. The author computed mean bi-hourly pressure curves for days with large and small ranges of temperature and the pressure deviations from a linear trend were subjected to harmonic analysis. "The amplitude of the semidiurnal, as well as the diurnal component, is larger on days with small temperature range." *Subject Headings:* **1. Diurnal pressure waves 2. Thermal gradient 3. Harmonic analysis.**—*I.L.D.*

4.7–117 551.543.5(744)

Crary, A. P. (*Cambridge, Mass.*) and Ewing, Maurice (*Palisades, N. Y.*), **On a barometric disturbance recorded on a vertical long-period seismograph.** *American Geophysical Union, Transactions* 33(4):499–501, Aug. **1952.** 2 figs. 8 refs. **MH-BH**—Large barometric fluctuations were observed on a recording microbarograph at Watertown, Mass. It was accompanied by prefrontal activities of a warm front which passed through that area about 6 hours later, and the periods of fluctuations were about 6 minutes and peak to peak amplitudes about 1.0 mb. This oscillation was noted on a barograph with a drum speed of 1.1 cm/hr at Blue Hill Observatory, but not on a barograph with a drum speed of 0.25 cm/hr. Oscillations of a similar period were recorded simultaneously at Weston College Observatory on a Benioff vertical seismometer with a 60 second recording galvanometer. "Calculation of the effect of atmospheric pressure upon the inertia mass of the seismograph show that changes in atmospheric buoyancy effects can satisfactorily explain the results observed." *Subject Headings:* **1. Pressure microvariations 2. Massachusetts.**—*I.L.D.*

4.7–118 551.543.5:551.515.13

Sonntag, G., **Die jahreszeitliche Abhängigkeit der Durchgangszeiten der Druckminima.** [The seasonal variation of the time of passage of pressure minima.] *Annalen der Meteorologie*, 5(3/5):141-146, **1952.** 17 figs., 14 refs. **MH-BH**—From literature author shows that frequencies of monthly pressure minima and of passage of cold fronts at European station are greatest about 4 h and 16 h. From 5 years microbarograph data at Collmberg, author then

plots hourly frequency of pressure minima in different seasons and finds that both maxima come nearer noon in winter and nearer midnight in summer; morning maximum is greater in winter and afternoon in summer. *Subject Headings:* **1. Pressure extremes 2. Cyclonic activity.**—*C.E.P.B.*

4.7–119 551.547.3:550.38

Kaciak, W. and Langwell, Patricia, **Relation between geomagnetic activity and pressure variations aloft.** *Journal of Meteorology*, 9(6):409–414, Dec. **1952.** 5 tables, 8 refs. **MH-BH**—Heights of 500 mb surface at points 30–60°N, 70–130°W, and of 400–700 mb surfaces in Arctic, and pressures at 3000 gdm in 50°N were averaged for each day from 4 before to 9 after magnetically disturbed and quiet days. No significant results were found with disturbed days, but pressure tended to be lower on the whole after quiet days, especially 3rd and 6th days after, in high latitudes. The nature of the relation is not clear. *Subject Headings:* **1. Upper air pressure 2. Terrestrial magnetism.**—*C.E.P.B.*

WIND

See also: **Development of NW winds at Vancouver** (Harry, Wright), 4.7–49; **Temp., wind direction and speed in tropics** (Conrad), 4.7–102; **Arctic sea-smoke, Hong Kong** (Starbuck,) 4.7–148.

4.7–120 551.553.11

*Bossolasco, Mario, **La breeza di mare a Genova ed in altre località costiere italiane.** [Sea breeze at Genoa and in other places along the Italian coast.] *Geofisica Pura e Applicata*, 21:169–181, **1952.** 3 figs., 9 tables, refs. Italian, German and English summaries p. 169. **MH-BH**—Data obtained during 1947–51 from anemograph records at the Geophysical Institute of the University of Genoa are analyzed to show hourly variations in wind direction and time of onset and ending of the sea breeze. The number of days with sea breeze at the university is compared with number of days with sea breeze at the "Concenter" (port). Maximum speed of sea breeze for each month (1947–51) shows strongest winds in June and July as a rule, but marked variations in some years in the seasonal regime. Similar data are provided for Savona (1938–9) and Belvedere Marittimo in Cosenza Province (1939–40). An intermittent coastal current which is directed cyclonically along the Ligurian coast is intimately connected with the duration and strength of the sea breeze at any given time of year. Comparison with global radiation records for Genoa shows relation of direction of sea breeze to intensity of insolation. A simple formula $d=0.025G$ is derived for this relation and it is shown that the dispersion from this curve is least in summer and greatest in winter. The strength of the sea breeze, whether on a daily or seasonal basis, arises either from cooling of coastal water or heating of littoral, or on the balance between the two factors. *Subject Headings:* **1. Sea breezes 2. Coastal currents 3. Coastal climates 4. Ligurian coast, Italy 5. Genoa, Italy.**—*M.R.*

4.7–121 551.553.4:551.583.15

Loewe, Fritz, Radok, U. and Grant, Alison, **Eine säkulare Klimaänderung im südlichen Indischen Ozean?** [A secular change of climate in the southern Indian Ocean?] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:11–15, **1952.** 2 figs., 2 tables, 16 refs., 6 eqs. **DWB**—Winds at Heard Is. 1856–59, Melbourne 1855–60, and Indian Ocean 35–50°S are compared with 1949–51 and vector resultant differences calculated. The recent observations show many fewer N and more SW winds than the early ones. The change is related to a change in circulation, possibly a stagnation of depressions in 100°E instead of 60°E, due to changes in sea temperature. *Subject Headings:* **1. Wind variations 2. Climatic variations 3. Indian Ocean.**—*C.E.P.B.*

4.7–122 551.553.8(260)

*Arakawa, H. and Tsutsumi, K., **Seasonal changes of daily frequency of squalls in the NW-Pacific.** *Papers in Meteorology and Geophysics*, Tokyo, 2(3-4):296–301, Dec. **1951.** 4 figs., 2 tables, 2 refs. **MH-BH**—Based upon all available observations from Japanese naval and

merchant ships, tables and charts of the daily frequency of squalls are presented for March June, Sept. and Dec. The largest frequency of squalls is observed in the equatorial belt eas of 125°E and south of 10°N. *Subject Headings:* **1. Squall frequencies 2. Northwest Pacific.**— *A.A.*

4.7–123 551.554:551.557.

Holzapfel, Rupert, **Über die Änderung der Windgeschwindigkeit mit der Höhe.** [O the change of wind velocity with height.] *Germany. Deutscher Wetterdienst in der US-Zone Berichte*, No. 42:252–255, **1952.** fig., 3 tables. **DWB**—A detailed statistical study is made o winds over Berlin to a height of 7 km and relations to those at 1 km. (*Same item as* 4E–240 May 1953, *MAB.*) *Subject Headings:* **1. Wind profiles. 2 Upper air winds 3. Berlin Germany.**—*C.E.P.B.*

4.7–124 551.555.

Frey, Karl, **Betrachtungen zum Föhn.** [Remarks on the föhn.] *Leben und Umwelt* Basel, 9(5):100–102, Feb. **1953.** fig. **DLC**—Reply to criticisms of author's earlier work by M. Bouet in *Leben und Umwelt*, Aug. 1952. A simple account of föhn and its phenomena i given, with a schematic diagram, and local peculiarities are discussed. *Subject Heading:* **1. Föhn theory.**—*C.E.P.B.*

4.7–125 551.555.3:551.557

Heigel, K., **Föhnstatistik und Aerologie.** [Föhn statistics and aerology.] *Germany Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:128–130, **1952.** 4 tables, 2 refs **DWB**—Investigation of upper winds at Munich on days of föhn at Bad Tölz showed that 19% had no S component between 850 and 500 mb. These are critically examined and author concludes that the ground level synoptic situation is sufficient criterion for a S föhn. *Subject Headings:* **1. Föhn winds 2. Bavaria, Germany.**—*C.E.P.B*

4.7–126 551.555.3

Trautmann, E., **Föhnwinde am vorderen Bayerischen Wald.** [Föhn on the slopes of the Bavarian forest.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:305–312, **1952.** 13 figs., 8 refs. **DWB**—Thermo- and hygrograms at Metten, Hausstein and Falkenstein show sudden rises of temperature and falls of humidity attributed mostly to anticyclonic föhn, caused by subsidence of air on radiation nights. Cases of cyclonic föhn and "air avalanches" are also described. *Subject Headings:* **1. Föhn winds 2. Bavaria, Germany.**— *C.E.P.B.*

4.7–127 551.555.4:551.311.12

Evers, Wilhelm (*Hannover*), **Gletscherwinde am Nigardsbre (Südnorwegen). Ein Beitrag zur Landschaftskunde von Gletschertälern.** [Glacier winds at Nigardsbre (S Norway). A contribution to physical geography of glacier valleys.] *Landschaft und Land* **1951.** p. 123–136. 8 figs., 2 plates, 7 refs. Abstracted from reprint.—The U-shaped Nigardsbre, 900 m deep and 4–5 km long, runs E.S.E. from main snow and ice field of S. Norway; upper half occupied by a retreating glacier. Observations were made in summer 1938 at foot of glacier and 3 km below. Pilot balloons showed down-valley wind 100–150 m deep, then calm zone and an up-valley wind until at 800–1200 m they took general direction of free winds. Temperature and wind records showed very close parallelism. Effect of glacier wind on landscape discussed. *Subject Heading:* **1. Glacial winds.**—*C.E.P.B.*

4.7–128 551.555.8

§Schmidt, Gerhard, **Schirokko—Lagen.** [Sirocco conditions.] Germany. Wetterwarte beim Oberbefehlshaber Süd, October **1942.** 15 p. 16 figs., 13 fold. charts, 6 refs. **DWB**— Using the extensive observational data compiled during the war by the weather observatory of the southern German High Command, the author re-examines sirocco conditions from a synoptic-aerological point of view. A general discussion of synoptic conditions associated with the sirocco is followed by selected case studies illustrated by synoptic charts and weather maps. *Subject Headings:* **1. Synoptic aerology 2. Sirocco.**—*M.P.K.*

WIND EFFECTS

See also: **Forecasting ocean waves** (Mund, Arthur), 4.7–5; **Formation and transformation of waves** (Tenani), 4.7–10, **Cloud types during N weather, Ljubljana** (Čadež), 4.7–152; **Weather and insurance** (Reichel), 4.7–173.

4.7–129 551.556:551.465

Hidaka, Kovi and Takano, K. (*Geophysical Inst., Tokyo Univ.*), **Wind-driven current and ateral mixing in a zonal ocean.** *Geophysical Magazine*, Tokyo, 23(4):487–495, May **1952.** figs., 2 refs., 19 eqs. **MH-BH**—The dynamics of ocean current in a zonal ocean produced by planetary wind system of the type we actually see over the ocean is treated. The effect of Coriolis forces varying with latitude and the effect of lateral mixing are taken into account. The chief results are that the effect of lateral mixing is only prominent for A larger than 10^8 nd that the vertical distribution of current velocity does not differ much from that inferred rom Ekman's theory, provided the current varies horizontally in response to the variation f wind system. *Subject Heading:* **1. Wind driven currents.**—*Authors' abstract.*

4.7–130 551.556:551.482.2

Williams, John R., **Effect of wind-generated waves on migration of the Yukon River in ne Yukon Flats, Alaska.** *Science*, 115(2993):519–520, May 9, **1952.** 7 refs. **DWB**—trong southwest winds in summer generate waves up to 3 ft in height which undercut the orth banks of the Yukon River and accelerate the northward migration of that river in the Yukon Flats. *Subject Headings:* **1. Wind waves 2. Erosion 3. Yukon River, Alaska.**—*M.P.K.*

4.7–131 551.556.1:551.556.4:551.46

Chuman, D., **The damage of sweet potato caused by briny wind accompanied with the yphoon Grace.** *Journal of Agricultural Meteorology*, Tokyo, 7(1):30–32, Dec. **1951.** 2 figs., refs. In Japanese, English summary p. 32. **DWB**—Damage caused to sweet potato by rine deposited during a typhoon on July 19 and 20, 1950 was investigated and found to be onsiderable in the southern coastal region of Kagoshima. Observations are reported regarding ne effect on different species, correlation between time of planting and amount of damage, ffect of protected location, etc. Windbreaks, planting of shielding crops, planting at proper me and making use of natural ridges are suggested as protective measures. *Subject Headings:* **. Wind damage 2. Salt spray 3. Sweet potatoes 4. Kagashima, Japan.**—*G.T.*

4.7–132 551.556.1:551.35(09)

Lawrence, E. N., **Floods of the past.** *Weather*, 8(3):78–79, March **1953.** **DWB**—Account f gradual destruction of Dunwich, East Anglia, between 1066 and 1740 A.D. by tidal erosion. *ubject Headings:* **1. Wind effects 2. Storm tides 3. Wave erosion 4. England.**—*C.E.P.B.*

4.7–133 551.556.1:551.586:633.11

Tsuboi, Y. and Izumi, S. (*Nat. Inst. of Agr. Sc.*), **Studies on wind injury to wheat (2). nvestigation of wind break.** *Journal of Agricultural Meteorology*, Tokyo, 7(2):45–47, June **952.** 3 figs., 2 tables. English summary p. 47. **MH-BH**—Thirteen typical types of wind-reaks were found in wheat fields. *Subject Headings:* **1. Windbreaks 2. Wind damage . Grain crops.**—*I.L.D.*

UPPER AIR WINDS AND VERTICAL MOTION

See also: **Winter temp. field with variable exchange coefficient over oceans and seas** (Shuleĭkin), 4.7–7; **Analysis of equivalent head winds on great circle Shannon–Gander and of errors in forecasting of same at London Airport** (Harley), 4.7–52; **Change of wind velocity with height** (Holzapfel), 4.7–123; **Föhn statistics and aerology** (Heigel), 4.7–125; **Jet stream bibliography** (Evans), p.

4.7–134 551.557.2:797.5

Neilan, J. C., **Speed in gliding.** *Flight*, London, 59(2206):524–525, May 4, **1951.** 5 figs. **DLC**—Tables, curves and a photo are presented to indicate optimum gliding and soaring speed

and angle in convection current, cross wind and still air flights. *Subject Headings:* **1. Optimum flight patterns 2. Gliding.**—*G.T.*

4.7–135 551.558

Vertical currents over northern England. *Meteorological Magazine*, London, 81(965):347–348, Nov. **1952.** table. **MH-BH**—Alternating up and down currents over corrugated StCu on July 11, 1952, are briefly investigated. *Subject Heading:* **1. Vertical currents.**—*C.E.P.B.*

4.7–136 551.558.1:797.5

Carmichael, B. H., **An analysis of Johnson's flight.** *Sailplane and Glider*, 20(1):15–18, Jan. **1952.** 3 figs. **GB-MO**—JOHNSON's 545 mile sailplane flight in Texas–Kansas Aug. 5, 1951, gave much information of speed in thermals (1.5–4 m/s). Distribution normal. "Efficiency" is discussed. *Subject Headings:* **1. Gliding 2. Great Plains.**—*C.E.P.B.*

4.7–137 551.558.1:797.5:06

Scorer, R. S., **O.S.T.I.V. 1952; meteorology and gliding.** *Royal Meteorological Society, Quarterly Journal*, 78(338):635–637, Oct. **1952. DWB**—Report of meeting near Madrid of Organisation Scientifique et Technique Internationale du Vol à Voile, July 1952. *Subject Headings:* **1. Gliding 2. Conferences.**—*C.E.P.B.*

4.7–138 551.558.1:797.5

Scorer, R. S., **Soaring in Spain 1952.** *Weather*, 7(12):373–376, Dec. **1952. MH-BH**—An interesting account of the problems of forecasting the appearance and movements of convective areas in mountainous country. *Subject Headings:* **1. Convection currents 2. Gliding 3. Spain.**—*C.E.P.B.*

AQUEOUS VAPOR AND HYDROMETEORS

HUMIDITY AND EVAPORATION

See also: **Evaporation from oceans** (Sverdrup), 4.7–8; **Radar echoes at vertical incidence from horizontally stratified atmos.** (Browne), 4.7–22; **Forecasting minimum relative humidity, W. Wash.** (Legg), 4.7–53; **Spontaneous nucleation in supersaturated water vapor** (Rodebush), 4.7–145; **Water problems, U. S.** (Meigs), 4.7–167.

4.7–139 551.571.1:551.501.4

Czarnowski, Maciej, **O pewnym nowym wzorze na prezność nasyconej pary wodnej.** [A new formula for saturation vapor pressure of water.] *Przegląd Meteorologiczny i Hydrologiczny*, v. 1950/1951:57–61, **1951.** 2 tables, 7 eqs. **DWB**—*Subject Headings:* **1. Vapor pressure calculations 2. Saturation vapor pressure.**

4.7–140 551.573

Haude, Waldemar, **Verdunstungsmenge und Evaporationskraft eines Klimas.** [Evaporation amount and evaporation force of a climate.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:225–229, **1952.** 5 figs., 2 tables, 11 refs. **DWB**—Author discusses difficulties of determining amount of moisture carried away by the wind—comparison of 5-day means of evaporation from a free water surface with readings of Piché and saturation deficit, and annual variation of water loss from bare soil and various plants. He concludes that measured evaporation data can be supplemented by saturation deficit at 14 h, with a suitable local factor. *Subject Heading:* **1. Evaporation measurement.**—*C.E.P.B.*

4.7–141 551.573(46)

Reichel, Eberhard, **Der Entwurf von Verdunstungskarten, erläutert am Beispiel der Iberischen Halbinsel.** [The construction of evaporation charts, illustrated by the Iberian Peninsula.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:234–238, **1952.** 2 figs., 2 tables, 11 refs. **DWB**—A chart of mean annual evaporation was constructed

rom differences between rainfall and runoff, and point values calculated from formulas of VUNDT and THORNTHWAITE. Height profiles of evaporation in relation to temperature and recipitation are given. *Subject Headings:* **1. Evaporation 2. Evaporation charts 3. Spain . Portugal.**—*C.E.P.B.*

CONDENSATION AND DEPOSITS

See also: **Correlation: snow crystal type and estimated temp. of formation** (Gold, Power), 4.7–160; **Artificial snow crystals aid investigation of atmos. processes** (Mason), 4.7–161; **Leakage in high tension direct current electrical transmission lines by fog** (Pauthenier, Cochet), 4.7–219.

4.7–142 551.574.1

Dufour, L., **Sur les transformations adiabatiques reversibles d'une goutte de solution n suspension dans l'atmosphère.** [On the adiabatic transformations of a drop of solution uspended in the atmosphere.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, er. A*, 5(3):346–349, **1953.** 4 refs., 13 eqs. French, German, English summaries p. 346. **DWB**—A formal mathematical study of the evolution of a droplet containing dissolved salt, t rest relative to the air, leads to an equation, difficult to solve, in complex functions of pressure nd temperature. *Subject Heading:* **1. Water drops.**—*C.E.P.B.*

4.7–143 551.574.1

Mrose, Helmut E., **Über die Entstehung nicht-anthropogener Kondensationskerne.** [On he origin of condensation nuclei not produced by man.] *Germany. Deutscher Wetterdienst n der US-Zone, Berichte*, No. 42:122–125, **1952.** 4 refs. **DWB**—A general account of natural ormation of condensation nuclei by solar (UV) radiation, sea spray and friction between olids, e.g., drifting sand. *Subject Heading:* **1. Condensation nuclei formation.**—*C.E.P.B.*

4.7–144 551.574.1

Pound, Guy M. (*Carnegie Inst. of Technology, Pittsburgh*), **Liquid and crystal nucleations.** *Industrial and Engineering Chemistry*, 44(6):1278–1283, June **1952.** 10 figs., 22 refs., 17 eqs. **DLC**—For liquid nucleation from vapor, there is surprisingly good agreement of elementary ate theory with experiment. It is thought that nucleation experiments may be used to study he properties of small aggregates of molecules and to estimate interfacial free energies where ne of the phases is a solid. Progress in the study of the kinetics of crystalline nucleus forma- ion in supercooled liquids has been hindered by the fact that it is difficult to prepare liquids hat are free of minute solid impurities which may catalize nucleation, and also that once a upercooled liquid has been seeded, crystallization by growth of the nucleus usually follows apidly, thus ending the experiment as soon as the first nucleus is formed. The solution of hese difficulties recently has led to progress in the quantitative study of the kinetics of this ype of nucleation. Developments in heterogeneous and homogeneous nucleation of condensed hases from the supersaturated vapor and in nucleation from supercooled liquids are reviewed. *Subject Headings:* **1. Nucleation 2. Supercooled liquids.**—*Author's abstract.*

4.7–145 551.574.1:551.571.1

Rodebush, Worth H. (*Univ. of Ill.*), **Spontaneous nucleation in supersaturated water apor.** *Industrial and Engineering Chemistry*, 44(6):1289–1291, June **1952.** fig., table, 16 eqs., refs. **DLC**—GIBBS showed that no stable equilibrium, such as has been assumed in the erivation of the Thomson equation, can exist between the liquid drop and the vapor phase. When the drop becomes small enough, it behaves like a large molecule and below a certain ritical size the translational and rotational entropies contribute a stabilizing factor which nakes equilibrium possible. It is assumed that the equilibrium concentration of these aggre- ates or clusters are present at all times. The equilibrium concentration decreases with ncreasing cluster size. When the supersaturation is increased to a point where a considerable oncentration of the critical size is present, condensation occurs immediately. The theory ppears to agree with the reported facts for water vapor, but more reliable data are needed. *Subject Headings:* **1. Nucleation 2. Supersaturation 3. Water vapor.**—*Author's abstract.*

4.7–146 551.574.1

Turnbull, David and Vonnegut, Bernard (*General Electric Research Lab., Schenectady*), **Nucleation catalysis.** *Industrial and Engineering Chemistry*, 44(6):1292–1298, June **1952.** 6 figs., 4 tables, 24 eqs., 32 refs. **DLC**—It is known that the structures of crystals and the substances that catalyze their formation closely resemble each other in atomic arrangement and lattice spacing on certain low index planes. A crystallographic theory of crystal nucleation catalysis predicts that the order of catalytic potency should be identical with the order of the reciprocal of the disregistry ($1/\delta$) between the catalyst and forming crystal on low index planes of similar atomic arrangement; that for small δ nuclei should form coherently with the catalyst —i.e., with a strain $\epsilon = \delta$; and that for δ very large $\delta \gg \epsilon$ and the interface between nucleus and catalyst can be thought of as consisting of regions of good fit separated by a dislocation gridwork. The energy of this interface should be proportional to the dislocation density, hence to $\delta - \epsilon$. There is evidence that ice nuclei may form coherently on silver iodide surfaces ($\delta = 0.0145$). Experience indicates that in general nuclei form coherently with catalysts only for $\delta \lesssim 0.005$ to 0.015. *Subject Headings:* **1. Nucleation 2. Ice crystal formation 3. Silver iodide.**—*Authors' abstract.*

FOG

See also: **Infrared spectroscopy of fog particles** (Kamiyama, Moriguchi), **4.7–36.**

4.7–147 551.575.1:551.588.7

Ooura, H., **The capture of fog particles by the forest.** *Journal of Meteorological Research*, Tokyo, v. 4, Suppl. Number:239–258, March **1952.** 7 figs., 3 tables, 13 eqs. In Japanese, English summary p. 336–337. **MH-BH**—The amount of fog water caught by a needle-leaved forest was measured by vertical nets to windward and leeward and by pairs of horizontal nets above the tree tops, one of each pair collecting drops carried either up or down and the other only falling drops. Collection on ground was also measured. The results are set out in tables with English headings, and ratios of catches of vertical V and horizontal H nets discussed in relation to wind velocity and radius of droplets (radius 0.09 mm, V/H = wind velocity m/sec). Eddy diffusivity estimated as 10^4 cm²/sec. Mechanism of capture of particles is discussed and a theoretical formula deduced. *Subject Headings:* **1. Fog dissipation 2. Forest influences.**—*C.E.P.B.*

4.7–148 551.575.1:551.555.6(51)

Starbuck, L., **Arctic sea-smoke at Hong Kong.** *Weather*, 8(3):77–78, March **1953.** table. **DWB**—Dec. 3, 1952, in 23 knot N wind, air temperature fell from 74.1 to 41.6°F, with sea temperature 69°F. Extensive sea smoke was formed, 3–4 ft deep, with mirage effects. *Subject Headings:* **1. Sea fog 2. Hong Kong.**—*C.E.P.B.*

4.7–149 551.575.1:551.524.31:551.525.2

Yoshida, J., **Diurnal change of air and ground temperature on a fog day.** *Journal of Meteorological Research*, Tokyo, v. 4, Suppl. Number:143–150, March **1952.** 5 figs., 2 refs., eqs. In Japanese, English summary p. 329–330. **MH-BH**—Assuming initial conditions at sunrise at a point near the sea, wind velocity, thermal diffusivity and liquid water in the fog, the resulting differential equations are solved and the solutions plotted in graphs. The solution gives the rise of air temperature near the ground after sunrise very closely. *Subject Headings:* **1. Fog dissipation 2. Diurnal temperature variations.**—*C.E.P.B.*

4.7–150 551.575.2(798)

Oliver, Vincent J., **Ice fog in interior Alaska.** (In: Alaskan Science Conference, Wash., D. C., 1950, **Proceedings, 1951.** p. 76.) **DWB**—Ice fog in interior Alaska forms in and around urban centers, elsewhere unrestricted visibility prevails. It is infrequent with temperatures warmer than −30°F; with colder temperature its frequency increases, reaching nearly 100% (in towns) at temperatures colder than −50°F. *Subject Headings:* **1. Ice fog 2. Fog distribution 3. Alaska.**—*I.L.D.*

4.7–151 551.575.2:551.588.7

Tabata, T., Fujioka, T., Matsumura, N. and Kuroko, M., **On the distribution of fog water contents in the surrounding of the forest at Ochiishi, 1951.** *Journal of Meteorological Research*, Tokyo, v. 4, Suppl. Number:203–210, March **1952.** 9 figs., 2 tables, 5 refs. In Japanese, English summary p. 333–334. **MH-BH**—Fog meters were set up at 10 points in and around the forest, June 20–July 1, 1951, and vertical gradients measured. In the forest canopy the amount of fog water decreased compared with windward edge and variations were retarded. Three and 8 m above canopy amount increased 1.7 and 2 times. *Subject Headings:* **1. Fog dissipation 2. Forest influences 3. Ochiishi, Japan.**—*C.E.P.B.*

CLOUDS

See also: **Radar cloud detection** (Gould), 4.7–25.

4.7–152 551.576.1:551.556:551.43(497.1)

Čadež, M., **Oblaci severnog vremena u Ljubljani.** [Cloud types during northerly weather at Ljubljana.] *Yugoslavia. Hidrometeorološka Služba. Hidrometeorološki Glasnik*, 1(2):110–116, **1948.** 12 figs. In Croatian. **DWB**—Cloud types usually connected with northerly winds passing over the Alps are described in general terms. They are "Ac op" or "Sc" at altitudes between 3 and 4 km above sea level and "Fst" or "Fcu" at 2 to 2.5 km. These latter are transformed into "Cu" and "Cb" during the warm season. Photographic samples of some typical clouds are presented. *Subject Headings:* **1. Cloud types 2. Wind effects 3. Orographic influences 4. Alps 5. Ljubljana, Yugoslavia.**—*G.T.*

4.7–153 551.576.11:656.71(56)

Weickmann, Ludwig F., **Auftreten von Hochnebeln am Flughafen Istanbul-Yesilköy.** [Occurrence of high fog at the Istanbul airport.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:199–203, **1952.** 5 figs., 3 tables, 6 refs. German and English summaries p. 199. **DWB**—Causes of low stratus at this Turkish airport are discussed and height distribution tabulated. Mean pressure charts are given for heights 0–200 and 200–1000 m and for frontal stratus, and diurnal development described in relation to wind, temperature and humidity. *Subject Headings:* **1. Stratus clouds 2. Istanbul-Yesilköy Airport 3. Istanbul, Turkey.**—*C.E.P.B.*

4.7–154 551.576.3 551.577.3

§Kubota, K., **Morning-cloudiness and rain at Nagoya.** *Journal of Meteorological Research*, Tokyo, 3(10):351–363, July **1951.** 11 figs., tables, refs. In Japanese, English summary p. (21). **MH-BH**—A study for the purpose of forecasting local weather in Japan accompanied by numerous synoptic charts. Morning cloudiness occurs during stable weather mostly under calm conditions. A weak front with southern upper wind direction seems to be essential for the occurrence of morning cloudiness and rain. The rainfall amount is usually less than 3 mm and lasts less than two hours. *Subject Headings:* **1. Cloudiness 2. Rain 3. Local forecasting 4. Nagoya, Japan.**—*A.A.*

PRECIPITATION

See also: **Radar melting band cross-polarization** (Browne, Robinson), 4.7–23; **Quantitative radar-rainfall problems** (Farnsworth), 4.7–24; **Radar measurement of point and areal rainfall** (Jones), 4.7–26; **Annual rainfall statistics** (MM.) (Anglo-Egyptian Sudan. Met. Service), 4.7–30; **Morning cloudiness and rain, Nagoya** (Kubota), 4.7–154; **Ecology of Pelmatohydra oligactis, Kirkpatricks Lake, Tenn.** (Bryden), 4.7–164; **Weather and insurance** (Reichel), 4.7–173.

4.7–155 551.577.11

Eriksson, Erik (*Royal Agri. Col. of Sweden, Uppsala*), **Composition of atmospheric precipitation. 1. Nitrogen compounds.** *Tellus*, 4(3):215–232, Aug. **1952.** 6 figs., 5 tables. **MH-BH**—The author presents a comprehensive survey of published data on the nitrogen content of atmospheric precipitation, discusses the different cycles proposed for nitrogen in the at-

mospheric precipitation and evaluates the biologic importance of combined nitrogen in air and precipitation. The contents of this review cover nitrogen as ammonia and nitrate, albuminoid nitrogen, nitrite nitrogen, nitrogen compounds in fog, dew, frost and condensed water from the air and the origin of nitrate and nitrite. Tables giving the amount of ammonia and nitrate nitrogen in precipitation in Europe, Asia, Australia, New Zealand, Africa and America, and monthly distribution of nitrogen compounds in precipitation in a few representative localities are included. *Subject Headings:* **1. Precipitation composition 2. Nitrogen content of precipitation 3. Nitrogen compounds.**—*I.L.D.*

4.7–156 551.577.2:551.501.9(75)

Beebe, Robert G. (*Weather Bur. Airport Station, Atlanta, Ga.*), **The distribution of summer showers over a small area.** *Monthly Weather Review*, 80(6):95–98, June **1952.** 5 figs., 3 refs. **DWB**—The scatter of summer showers in both time and space over the southeastern States is such that the distribution of synoptic weather reporting does not permit an accurate appraisal of the distribution of rainfall. The objectives of this investigation are to determine (1) the density of the reporting network that would be necessary to describe the areal coverage of rainfall in a given locality, and (2) the relation between this areal coverage and the average amount of rain. The localities chosen for study are Birmingham, Ala., and Atlanta, Ga., and the areas representative of these localities are defined as circles of about 50-mile radius around the Birmingham and the Atlanta airports. Precipitation data used to determine the areal distribution were taken from 37 cooperative stations plus 3 first-order reporting stations in each of these areas. An analysis of these data shows, for most purposes at least, that this distribution of 40 stations provides a good indication of the precipitation coverage, and further that an observation from one station or even the 3 first-order stations is not representative of the areal coverage. A close relationship is found between the average amount of rain per station and the areal coverage. *Subject Headings:* **1. Rainfall distribution 2. Rainfall networks 3. Southeastern United States.**—*Author's abstract.*

4.7–157 551.577

Flohn, Hermann and Huttary, Josef, **Zur Kenntnis der Struktur der Niederschlagsverteilung.** [The structure of precipitation distribution.] *Zeitschrift für Meteorologie*, 6(10):304–309, Oct. **1952.** 2 figs., 4 tables, 15 refs. **MH-BH**—The relationship of the amounts and frequency of rainfall of an individual locality to the simultaneously measured diurnal values of neighboring stations is investigated. The spatial structure of the distribution of precipitation is examined by determining the frequency with which rainfall occurred at reference stations and adjoining groups of stations within three networks centered around Oldenburg, Halle a.d. Salle and Munich regardless of the amount of precipitation at the comparison stations. The precipitation is distinguished into organized (general and scattered) and nonorganized (isolated) and the annual and seasonal distribution of each type indicates that the general precipitation accounts for 80% precipitation amount; the scattered for about 19% and the isolated for about 1% of the amount of precipitation. A summation function showing the relationship of precipitation amount to frequency in percent is constructed for Germany and its use in precipitation forecasting is discussed. *Subject Headings:* **1. Precipitation distribution 2. Precipitation forecasting 3. Germany.**—*I.L.D.*

4.7–158 551.577.2(42) 551.577.3(42)

*Reynolds, G., **Rainfall at Bidston, 1867–1951.** *Royal Meteorological Society, Quarterly Journal*, 79(339):137–149, Jan. **1953.** 9 tables, 7 refs., 3 eqs. **DWB**—This paper gives a mass of statistical information about the rainfall of Bidston, Cheshire, England, including monthly, seasonal and annual means, extremes and deviations, frequencies and correlations, wet days, droughts, etc. If R is mean fall of a month, probability of any month being the wettest of the year is proportional to R^3 and of its being the driest to $1/R$. *Subject Headings:* **1. Rainfall data 2. Rainfall variations 3. Bidston, England.**—*C.E.P.B.*

4.7–159 551.577.2:551.515.4(43)

Schöne, V., **Niederschlags- und Gewitterbeobachtungen in Salzwedel aus den Jahren 1738–1751.** [Precipitation and thunderstorm observations in Salzwedel for the period of

1738–1751.] *Zeitschrift für Meteorologie*, 6(9):277–283, Sept. **1952.** 11 tables, 10 refs. **MH-BH**—The author attempts to find singularities in a 14-year record of precipitation and thunderstorm frequency at Salzwedel for the period 1738–1751 and to compare them with hitherto known singularities. Tables show: frequency of days with precipitation for each month; frequency of days with snow, and snow and rain, and frequency of days with thunderstorms, mean and extreme dates of first and last snowfall for Salzwedel (1738–1751), Gardelegen (1881–1930) and Donitz (1898–1930) and monthly total of days with precipitation, hail, thunderstorm for each year of the period 1738–1751. A comparison of data of thunderstorm frequency and precipitation singularities of FLOHN and BAUR indicates the presence of singularities in the data for Salzwedel. *Subject Headings:* **1. Singularities 2. Precipitation frequencies 3. Thunderstorm frequencies 4. Salzwedel, Germany.**—*I.L.D.*

SNOW

See also: **Met. situation, Oct. 26, 27, 28, 1951** (Gazzola), 4.7–76.

4.7–160 551.578.41

Gold, L. W. and Power, B. A., **Correlation of snow-crystal type with estimated temperature of formation.** *Journal of Meteorology*, 9(6):447, Dec. **1952.** fig. **MH-BH**—Types of snow crystals reaching ground at Montreal are compared with estimated temperature of parent cloud. Peak temperatures (°C): columns −25 to −20, needles −6, plates −10 and −20, dendrites −16. *Subject Headings:* **1. Snow crystals 2. Montreal, Quebec.**—*C.E.P.B.*

4.7–161 551.578.41:551.574.1

Mason, Basil John, **Künstliche Schneekristalle dienen der Erforschung atmosphärischer Vorgänge.** [Artificial snow crystals aid the investigation of atmospheric processes.] *Die Umschau*, 53(1):15–17, Jan. 1, **1953.** 12 figs., table, 3 refs. **DLC**—This interesting article describes laboratory experiments in which snow crystals were formed under conditions resembling nature. Crystals formed with or without nuclei of AgI or dry ice in a cloud of small water drops at 0 to −40°C were collected on glass slides and covered with transparent plastic. Crystal forms are tabulated according to temperature. Growth was also microfilmed on polished metal plates cooled to different temperatures or on glass slides. The article is illustrated by excellent microphotographs with scales. *Subject Heading:* **1. Snow crystal formation.** —*C.E.P.B.*

4.7–162 551.578.41:548.7

Reineck, H. E., **Schneekristall—Abdrücke im Schlamm.** [Snow crystal imprints in mud.] *Die Umschau*, 53(3):80, Feb. 1, **1953.** 5 figs., 3 refs. **DLC**—Photographs of ice crystals in gelatine and snow and ice crystals in fine mud. *Subject Heading:* **1. Snow crystals.**—*C.E.P.B.*

4.7–163 551.578.46

Obenland, E. and Obenland, L., **Zum Entwicklungsgang der Schneedecke.** [On the development of the snow cover.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:186–190, **1952.** 2 figs., 4 tables, 5 refs. **DWB**—A detailed study of the average snow depth and frequencies day by day at Oberstdorf, Bavaria (810 m) based on records 1905/06–1949/50. Snowfalls of 10 cm or more are related to weather types. *Subject Headings:* **1. Snow accumulation 2. Obersdorf, Germany.**—*C.E.P.B.*

HYDROMETEOROLOGY

4.7–164 551.579:551.481:551.526:551.577.37

Bryden, Robert R., **Ecology of *Pelmatohydra oligactis* in Kirkpatricks Lake, Tennessee.** *Ecological Monographs*, Durham, N. C., 22(1):45–68, Jan. **1952.** graphs, tables, refs. **DLC**—Table shows changes in CO_2, O_2, acidity and alkalinity, temperature of air and water in lake following period of heavy rainfall. Seasonal differences due to rains or melting snow are noted: rain water from surrounding land brings in considerable CO_2, but alkalinity is only temporarily disturbed after heavy rain. Water temperature fluctuations were recorded for 1948 and 1949.

Subject Headings: **1. Limnology 2. Lake temperatures 3. Excessive rainfall 4. Rainfall effects 5. Ecology 6. Kirkpatricks Lake, Tenn.**—*M.R.*

4.7–165 551.579:551.311.2:631.4

Marston, Richard B. (*U. S. Forest Service, Ogden, Utah*), **Ground cover requirements for summer storm runoff control on aspen sites in Northern Utah.** *Journal of Forestry*, 52(4):303–307, April **1952.** 5 figs., 6 refs. **DLC**—Results of a plot study of the effects of different amounts of plant cover on surface runoff and erosion for the period 1936 to 1949 are presented. A relationship is given between the soil amount eroded and the rainfall surface runoff coefficient (η) and for the storm surface runoff coefficient and the ground cover percent, dependent on the rainfall intensity per hour. The soil eroded is negligible at $\eta = 5\%$ but increases rapidly at higher η. The author requires a minimal ground cover of 65% for effective protection from erosion. Unfortunately, no data are given about the steepness of the slopes under investigation. *Subject Headings:* **1. Soil erosion 2. Vegetation influences 3. Runoff 4. Northern Utah.**—*A.A.*

4.7–166 551.579(02)(47)

Matusewicz, J., **Przeglad literatury hydrologicznej radzieckiej.** [Review of Soviet literature on hydrology.] *Przegląd Meteorologiczny i Hydrologiczny*, v. 1950/1951:231–236, **1951. DWB**—The works of Arystovskiĭ, Bykov, Velikanov and Zhelezniakov are reviewed. *Subject Headings:* **1. Hydrologic literature 2. U.S.S.R.**—*W. Tomczykowski.*

4.7–167 551.579:551.573

†Meigs, Peveril (*OQMG—Wash., D. C.*), **Water problems in the United States.** *Geographical Review*, 42(3):346–366, July **1952.** 9 figs., 48 refs. **DWB**—The problem of water supply and usage in the United States is examined from a broad perspective and in detail with respect to the several factors involved (precipitation, evapotranspiration, surface runoff and ground water on the one hand, and irrigation, industrial, hydroelectric and other uses on the other hand). Precipitation records from 1850 to 1950 for New York City, Pierre, S. Dak., and San Diego, Calif., are shown to illustrate complicated variations in annual precipitation. The author discounts any "trend" as depending on just when one starts reckoning. However, the increasing temperature in the past 40 years may affect evapotranspiration and hence decrease water supply if continued. Recent droughts in the Southwest and New York, and attempts at rain making to relieve drought are cited. Charts showing precipitation, evapotranspiration, runoff and erosion in the Missouri Basin are presented. *Subject Headings:* **1. Hydrologic cycle 2. Drought 3. Potential evapotranspiration 4. Long period records 5. Missouri Basin 6. United States.**—*M.R.*

4.7–168 551.579:06(434/5)

Reichel, Eberhard (*German Weather Service, U. S. Zone, Bad Kissingen*), **Zusammenarbeit von Hydrologie und öffentlichem Wetterdienst.** [Cooperation between hydrology and public weather service.] *Wasser und Boden*, Hamburg, Oct. **1951.** p. 230–231. Abstracted from reprint. **DWB**—In reference to an article by Th. Oehler published under the above title in *Wasser und Boden*, No. 1:6–7, 1950, the author discusses some of the meteorological aspects of the problem. Post-war difficulties in raising sufficient funds are mentioned as hampering current or planned observation programs. Hydrologic projects carried on by the German Weather Service, U. S. Zone, are briefly described. They include precipitation recording, flood forecasting and measurement of evaporation and of snow cover. *Subject Headings:* **1. Hydrometeorological services 2. Germany. I. Germany. Deutscher Wetterdienst in der US-Zone II. Oehler, Th.**—*G.T.*

4.7–169 551.579(09)(43)

Schroeder, Gerhard (*Bielfield, Germany*), **Rückblick und Ausblick.** [Retrospect and prospect.] *Deutsches Gewässerkundliches Jahrbuch, Besondere Mitteilungen*, No. 4:6–9, **1952. DWB**—Brief historical report about the development of official hydrologic research work in Germany. The "Preussische Landesanstalt für Gewässerkunde" was founded in 1902 and

n 1935 became the headquarters for all hydrologic observation and research work for the whole of Germany. Now the work of this institution is being carried on by the "Forschungsanstalt für Schiffahrt, Gewässer- und Bodenkunde," Berlin in East Germany and the "Bundesanstalt für Gewässerkunde" Bielefeld (from summer 1952 in Koblenz) in West Germany. *Subject Headings:* **1. History of hydrology 2. Hydrologic institutes 3. Germany.**—*A.A.*

4.7–170 551.579.3:551.461.2

Carter, George F. (*Isaiah Bowman School of Geogr., Johns Hopkins Univ.*), **The sea and the land.** *U. S. Office of Naval Research, Research Reviews,* Nov. **1952.** p. 19–24. illus. **DWB**—Changes in sea level are brought into direct relationship with the melting of glaciers. The last few decades show a steady rise in sea level throughout the world. It is not possible, the author states, to predict future rises, but continuing warming of the climate indicates that further rise may be expected and "conservative planning of harbor installations should provide for an 18 to 24-in. sea level rise within a century." Total amount of ice on land would be capable of causing a sea level rise of 100 ft. Old river beds now under sea and sediment deposits in present river beds testify to earlier low and high sea levels. *Subject Headings:* **1. Sea level changes 2. Glacial ablation.**—*G.T.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

4.7–171 551.58:629.13

†Guss, Hans, **Die Klimatologie im Dienste der Luftfahrt.** [Climatology in the service of aviation.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte,* No. 42:299–305, **1952.** 3 figs., 29 refs. **DWB**—Summary of data required, illustrated by graphs of visibility and low cloud. The number of years of observations of various elements in islands, coasts, plains and mountains required as a basis are set out. Useful bibliography. *Subject Heading:* **1. Aviation climatology.**—*C.E.P.B.*

4.7–172 551.58:631.445

Rassow, L., **Landwirtschaftliche Klimafaktoren für Mitteldeutschland und das mittlere Norddeutschland.** [Agricultural climatic factors for central and mid-north Germany.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte,* No. 42:164–169, **1952.** 4 figs., tables. **DWB**—Charts and tables are given of climatic factor $K = A(B+C)/1000$ for 5 types of soil from heavy to light. A is temperature of growing period (over 5°C). B is rainfall minus evaporation in relation to optimum (heavy soil 400 mm/yr, light 600) and C is a rainfall reliability term. *Subject Headings:* **1. Agricultural climatology 2. Soil types.**—*C.E.P.B.*

4.7–173 551.58:368.16:551.556.1:551.577.6

Reichel, Eberhard (*Munich*), **Wetterfragen im Versicherungswesen.** [Weather problems in the field of insurance.] *Versicherungswirtschaft,* Karlsruhe, 6(20):418–421, Oct. 15, **1951.** 3 figs. **DWB**—The author discusses in detail the type of meteorological data which is particularly important to insurance companies. Precipitation and temperature are important for determining conditions of streets and highways; visibility and illumination data are necessary for evaluating causes of accidents; wind and storm data for damage to buildings; humidity and temperature for deterioration of goods. Also the frequency of various meteorological elements and of weather phenomena are important in the field of insurance. *Subject Headings:* **1. Insurance 2. Weather damage 3. Climatic effects.**—*I.L.D*

4.7–174 551.58(09)

Schneider-Carius, Karl, **Einige Phasen aus der Wissenschaftsgeschichte der Klimatologie.** [Some phases in the history of climatology.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte,* No. 42:454–459, **1952.** 18 refs. **DWB**—Philosophical history of climatology from Herodotus and Hippocrates through Humboldt to present, and thoughts on regional and organic climatology. *Subject Heading:* **1. History of climatology.**—*C.E.P.B.*

CLIMATE OF PARTICULAR PLACES

4.7–175 551.582(669)

Miller, Ronald, **The climate of Nigeria.** *Geography*, 37(4):198–213, Nov. **1952.** 10 figs **DWB**—Opens with an account of the ITF and wind systems over Nigeria. Following sections include harmattan and its effects which are deleterious in the north, annual and monthly rainfall with maps and diagrams, "tornadoes" (frontal storms) and associated heavy rains, lightning and its fertilizing effects, and a brief account of temperature variation and its effects. *Subject Headings:* **1. Local climates 2. Climate of Nigeria 3. Nigeria.**—*C.E.P.B.*

4.7–176 551.582(87)

*Röhl, Eduardo (*Dir. Obs. Cagigal, Caracas*), **Climatologia de Venezuela.** Caracas, Tip. Americana, **1946.** 86 p. tables, graphs, foot-refs. Also published as: *Academia de Ciencias Fisicas, Matematicas y Naturales, Caracas, Boletín*, No. 27. **DWB**—The territory of Venezuela is described as including 4 climatic zones (tropical, subtropical, subalpine and alpine). Average data on air and soil temperature, pressure, relative humidity and precipitation are tabulated and commented on. The data on precipitation which include monthly and annual rainfall amounts and number of rainy days as recorded at Cagigal Observatory from 1891 to 1944 are quite complete. A precipitation chart for Venezuela is attached. *Subject Headings:* **1. Climate of Venezuela 2. Precipitation data 3. Long period records 4. Venezuela.**—*G.T.*

4.7–177 551.582.1(767)

*East Africa High Commission. Meteorological Dept., **A note on the weather at Nairobi.** *East Africa High Commission, Pamphlet* [*Series*] (2). rev. **1952.** 5 p. tables. **GB-MO**—Monthly tables of temperature, humidity, sun and rain. *Subject Headings:* **1. Climate of Nairobi 2. Nairobi, East Africa.**—*C.E.P.B.*

4.7–178 551.582.1(436)

Kossinna, Erwin, **Zum Klima Vorarlbergs.** [Climate of Vorarlberg.] *Germany, Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:390–393, **1952.** fig., 17 refs. **DWB**—General description without tables of the climatic influences. *Subject Headings:* **1. Local climates 2. Climate of Vorarlberg 3. Vorarlberg, Austria.**—*C.E.P.B.*

4.7–179 551.582.1(82)

Sajarevich, Emilio E. **Ensayo sobre el clima de invierno en el Valle de Tafi.** [Study on the winter climate of the Valley of Tafi.] *Tucumán, Argentina. Universidad Nacional, Instituto de Estudios Geográficos, Publicaciones Especiales*, 2:193–206, **1951.** table. In Spanish, Germany summary p. 206. **DWB**—Although winter (April–Sept.) is seemingly very dry in this isolated mountain valley, the fact that the rain or snow falls in drizzle form, allows the precipitation to attain maximum effectiveness when it is very cool. Snow is insignificant and occurs in April, May and Sept. Temperature falls below freezing, skies are usually clear and almost no precipitation occurs in July and Aug. The zonda, a föhn-like N wind occurs with great regularity in winter. It is strong and accompanied by dust. The study is based on brief data (1948–9). *Subject Headings:* **1. Winter climatic elements 2. Orographic effects 3. Zonda 4. Tafi Valley, Tucumán, Argentina.**—*M.R.*

4.7–180 551.582.1(675)

Schmitz, A. (*Inst. Nat. pour l'Étude Agron. du Congo Belge*), **Essai sur la délimitation des régions naturelles dans le Haut-Katanga.** [Essay on the limits of the natural regions in the Upper Katanga.] *Belgium. Direction Générale de l'Agriculture, de l'Elevage et de la Colonisation, Bulletin Agricole du Congo Belge*, 43(3):697–734, Sept. **1952.** 3 tables, diagr., bibliog. In French, Flemish summary p. 733–734. **DWB**—The territory under review is divided into several regions determined by considering characteristics of geography, orography, composition of soil, climate, etc. The chapter on climate (p. 698–706) contains general descriptions, discussion of local influences, and tabulated data on the variation of temperature as a function of latitude and altitude and on monthly average rainfall amounts. The data presented (with one exception) have been adopted from VANDENPLAS (1947). *Subject Headings:* **1. Climate of the Upper Katanga 2. Upper Katanga, Belgian Congo.**—*G.T.*

4.7–181 551.582.1(57) 551.481.1

Vereshchagin, Gleb IUl'evich, **Baĭkal. Nauchno-populiarnyĭ ocherk.** [Lake Baikal. Popular scientific sketch.] Moscow, Gos. Izdat. Geograficheskoĭ Literatury, **1949.** 226 p. Illus., 3 tables, graphs, map (fold.) **DLC**—Besides the descriptive material on the physiography, geology, flora and fauna in this book, the chapter on "Water masses of Lake Baikal" (p. 64–95) and the one on "Climatic characteristics of Lake Baikal" (p. 96–103) contain information and data of interest to limnologists and climatologists. The chemical composition, the water balance, temperature of water at the surface and down to a depth of 900 m, ice cover and shore ice conditions are treated in the former chapter, and the effect of the lake on temperature above and around the lake, and the effect of the climate on vegetation and life in the vicinity are outlined briefly in the latter. *Subject Headings:* **1. Limnology 2. Climate of Lake Baikal 3. Lake Baikal, U.S.S.R.**—*M.R.*

4.7–182 551.582.2(728.6)

*Costa Rica. Dirección General de Estadística, **Geografía de Costa Rica: datos básicos.** [Geography of Costa Rica: basic data.] [New ed.] San José, Sección de Publicaciones, **1950.** 25 p. mostly tables. **DLC**—Pt. I consists of a table of elevations and coordinates of numerous places in Costa Rica. Pt. II (p. 6–25) gives basic comparative data for San José for each month during 1945–49, and mean and absolute minimum and maximum and mean temperatures for 27 stations in Costa Rica for 1949 and precipitation data for 32 stations (1948 and 1949 and average of entire period of record). *Subject Headings:* **1. Climatic data 2. Annual meteorological reports 3. Costa Rica. I. Quiros Amador, Tulia.**—*M.R.*

4.7–183 551.582.2(861)

*Rockefeller Foundation, [**Weather data for Villavicencio, Colombia, South America, 1941–May 9, 1943.**] n.d. unpaged. all tables. Running title at head of each page: "Villavicencio: Climate from Week no.—to Week no.—." Typed manuscript. **DWB**—A crude collection of temperature, (relative) humidity, evaporation and rainfall data summarized by weeks and for each whole or part of a year (1941–3) during period indicated. Daily values are also given for each element, but it must be assumed that temperatures are °C, humidity % and evaporation in mm. No indication of station location, height or exposure of instruments appears. *Subject Headings:* **1. Observational data 2. Climatic summaries 3. Villavicencio, Colombia.**—*M.R.*

CLIMATIC CHANGES

See also: **Climatic effects of equatorial circulation anomalies** (Flohn, Hinkelmann), 4.7–75; **Secular change of climate, S. Indian Ocean** (Loewe, Radok, Grant), 4.7–121.

4.7–184 551.583:519.2

Ogawara, M. and Yamazaki, H. (*Met. Res. Inst., Tokyo*), **Multivariate regression theory and its application to the problem of climatic change.** *Meteorological Society of Japan, Journal, 2nd Ser.*, 30(5):158–165, May **1952.** 2 figs., 7 eqs. **MH-BH**—The author gives a mathematical analysis of the correlation between climatic trends at several stations, based on the multivariate normal regression theory of S. S. Wilks. Formulas are developed (on account of statistical probability) for testing the significance of climatic tendencies at one station against changes at neighboring stations. The method is applied to Aug. temperature at Hokkaido (1900–1950) and other points in Japan. The rise in temperature during the period analyzed appears to be significant according to the regression theory. *Subject Headings:* **1. Climatic variations 2. Statistical analysis.**—*G.T.*

4.7–185 551.583.3:551.311.13

†Flint, Richard Foster, **The Ice Age in the North American Arctic.** *Arctic*, Ottawa, 5(3):135–152, Oct. **1952.** 6 figs., 29 refs. **DLC**—An account is given of the evidence for, nature and extent of Pleistocene glaciation of North America. Growth and disappearance of glaciers is described and evidence for repeated glaciation summarized. Temperature variation, estimated as 8°C below to 2° above present, is attributed to elevation and variations of solar

radiation. Effect of glaciation on life is discussed. *Subject Headings:* **1. Glacial periods 2. Glaciation 3. Ice age 4. North America.**—*C.E.P.B.*

4.7–186 551.583.3(798)

†Heusser, Calvin J. (*Amer. Geog. Soc., N. Y.*), **Pollen profiles from southeastern Alaska.** *Ecological Monographs*, Durham, N. C., 22(4):331–352, Oct. **1952.** 20 figs., bibliog. p. 350–352. **DLC**—The first pollen analysis made on this continent was by AUER (southeast Canada) in 1927. No systematic profiles have been made within 400 miles of the area in southeast Canada covered by these studies which were made in 1950 and 1951 at seventeen sites near Ketchikan, Wrangell, Sitka and Juneau. Glaciation, climate, vegetation (forests, muskegs, etc.) and methods of analysis of peat sections are described. Each region studied is taken up individually and pollen profiles reproduced for each of 4 or 5 types of pollen found in the peat. These are integrated to form a scheme wherein the last 8000 years are divided into 5 major periods. (It is estimated that these sites were deglaciated about 8000 years ago.) The cool moist period from 8000 to 6000 years ago (lodge-pole pine) was followed by warming and drying for 1000 years (Sitka spruce) maximum warmth 2000–5000 years ago (hemlock) and then cool and wet to ca. 1750 (pine). Postglacial volcanism and changes in sea level are also discussed in connection with profiles. Evidence of climate from glacier advances and retreats and from sedimentation and radiocarbon dating also incorporated. *Subject Headings:* **1. Pollen analysis 2. Postglacial climates 3. Forest succession 4. Radiocarbon dating 5. Southeastern Alaska.**—*M.R*

MICROCLIMATOLOGY

See also: **Macro-, meso- and microclimatic data for study of atmos. pollution** (Bacsó), 4.7–60; **Relation between air temp. in observation field and barley field** (Daigo, Maruyama), 4.7–100; **Influence of local climate on mean temp.** (Boer), 4.7–105.

4.7–187 551.584:634.1/7

Debor, H. W., **Obstbaupraxis und Kleinklima.** [Fruit culture and microclimate.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:68–69, **1952. DWB**—Viticulture is very susceptible to local climate. Article discusses danger of freezing blossoms, wind damage and soil moisture, all of which are local questions. *Subject Headings:* **1. Microclimatology 2. Viticulture.**—*C.E.P.B.*

4.7–188 551.584.2:551.524.3

Sekiguti, T., **Studies on local climatology (VII) Temperature distribution and surface covers.** *Papers in Meteorology and Geophysics*, 2(3–4):302–310, Dec. **1951.** 4 figs., 4 tables. **MH-BH**—Observations of the temperature distribution over different surface covers were made during calm days. It was warmer on cultivated fields, bare and bush lands and cooler in forests, grass and marshy lands. The differences were about 0.6–1.0°C. *Subject Headings:* **1. Local climates 2. Temperature variations 3. Vegetation influences.**—*A.A.*

4.7–189 551.584.2:551.586:615.838

Eger, K., **Ermittlung und Festlegung des Kleinklimas (Bäderklima) von Bad Nauheim.** [Determination of microclimate (bathing resort climate) of Bad Nauheim.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:451–453, **1952.** 2 figs. **DWB**—Contour maps of Bad Nauheim with forests and build up areas show areas with temperature above and below mean, extreme regions and those with great temperature variations, based on auto journeys. *Subject Headings:* **1. Local climates 2. Bad Nauheim, Germany.**—*C.E.P.B.*

4.7–190 551.584.2/3

Kreutz, Wilhelm, **Lokalklimatische Studie im oberen Vogelsberg.** [Local climatic studies in upper Vogelsberg.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:171–176, **1952.** 6 figs., 6 tables. **DWB**—A study of local climatology of districts of Rebgeshain near Giessen, including charts of minimum temperature, isohyets, wind speed and evaporation. *Subject Headings:* **1. Local climates 2. Topographic effects 3. Vogelsberg, Germany.**—*C.E.P.B.*

4.7–191 551.584.3(436)

Wetzlar, Th. Arzt, **Kleinklimatische Messungen an der Glockner-Hochalpenstrasse.** [Microclimatic measurements at the Glockner Pass.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:263–269, **1952.** 4 figs., 3 refs. **DWB**—In this narrow valley running S, observations were made on floor at 1948 m, terrace at 1955 m and both sides at 2010 m in Oct. 1943. Diurnal variation of temperature is shown and relative humidity, wind and soil temperature discussed. Then microclimatic sections were made across and down the valley and in a small patch of vegetation. *Subject Headings:* **1. Microclimatology 2. Topographic effects 3. Austria.**—*C.E.P.B.*

4.7–192 551.584.31

Howe, G. Melvyn, **A Cardiganshire frost hollow.** *Weather*, 8(3):69–71, March **1953.** 2 figs. **DWB**—Temperatures measured on car rides inland from Aberystwyth, Wales, showed very low night minima in a hollow 3 miles inland, 5.5 to 8°F below surrounding hills. *Subject Headings:* **1. Frost pockets 2. Wales.**—*C.E.P.B.*

CLIMATIC CLASSIFICATION

4.7–193 551.585:91

Biasutti, Renato, (*Univ. di Firenze*), **Il paesaggio terrestre.** [Terrestrial landscapes.] Torino, Unione Tipografico-Editrice Torinese, **1947.** 379 p. 209 figs., refs. **DWB**—A beautifully illustrated text on the physiography, climate and vegetation of the various regions of the earth, with separate chapters on such subjects as distribution of temperature; winds and precipitation; classification of climate; climate and vegetation; hydrography of the seas; man and subtropical climates; and various climatic descriptions in chapters on other regions or physiographic types. *Subject Headings:* **1. Geography 2. Ecology 3. Climatology.**—*M.R.*

4.7–194 551.585.53 551.45

Elston, R. N., **Desert research.** *Science News*, 27:7–29, **1953.** 6 figs., 10 refs. **DWB**—Relation of deserts to rainfall and evaporation is summarized, with a section on desert climatology and climatic classification. A recorded air temperature of 148° in NW Pakistan is quoted. Other sections deal with wind-blown sand, hydrology, plants, soils and ecology, effective rainfall (months with P/E 1/3) and windbreaks. Russian development schemes are described. *Subject Headings:* **1. Deserts 2. Climatic classifications.**—*C.E.P.B.*

4.7–195 551.585.53:551.45

Gschwend, M., **Morphologische Bilder vom Rande der Wüste.** [Morphological photographs from the edge of the desert.] *Leben und Umwelt*, Basel, 9(4):73–79, Jan. **1953.** 11 figs. **DLC**—Author discussed photographs on southern slope of High Atlas showing effect of summer drought on surface forms and deposits. *Subject Heading:* **1. Deserts.**—*C.E.P.B.*

BIOCLIMATOLOGY

See also: **Transmission of short-wave radiation through forest canopy** (U. S. Corps of Engineers, U. S. Weather Bureau), 4.7–97; **Wind injury to wheat** (Tsuboi, Izumi), 4.7–133; **Microclimate, Bad Nauheim** (Eger), 4.7–189.

4.7–196 551.586:61

Dirnagl, K., **Statistische Betrachtungen zu einer meteorobiologischen Untersuchung.** Statistical considerations in a meteoro-biological investigation.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:371–374, **1952.** 3 figs., 4 tables, 7 refs. **DWB**—An investigation of the part played by weather in comparison with chance variations in health by analysis of variance shows that while in one healthy subject the weather effect is inappreciable, on the average of 52 it accounts for 78% of the variations. The correlation of average health with H. UNGEHEUER's "Relative biological weather effect" was −0.61, with individual elements shows temperature and humidity to be most important. *Subject Heading:* **1. Weather sensitivity.**—*C.E.P.B.*

4.7–197 551.586:612

†Pfleiderer, H., **Zur Bioklimatik des menschlichen Wärmehaushaltes.** [On the bioclimatics of human heat economy.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:338–341, **1952.** 30 refs. **DWB**—A summary of the literature shows a change of viewpoint in the last decade from cooling power towards different effects of weather types. Many other problems of thermally effective climatic factors are referred to. *Subject Heading:* **1. Cooling power.**—*C.E.P.B.*

4.7–198 551.586:613.1

Zimmermann, Gerhard, **Andauer und Tagesgang der Schwüle nach stündlichen Auswertungen in Potsdam.** [Duration and diurnal variation of sultriness from hourly evaluations in Potsdam.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:23–27, **1952.** 2 figs., 7 tables, 7 refs. **DWB**—A sultry hour is defined as one in which vapor pressure reached 14.1 mm. Mean number of hours (1924–38) 146.1, on 24.2 days, duration of sultry periods 1–27 hrs. Most frequent 18–22 hrs and 9 hrs. *Subject Headings:* **1. Sultriness 2. Potsdam, Germany.**—*C.E.P.B.*

4.7–199 551.586:615.8

Cordes, H., **Zur Methodik in der Kurortklimatologie.** [Methodics of health resort climatology.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:154–158, **1952.** 6 tables, 13 refs. **DWB**—The suitable climate for therapy depends on the degree of illness and the constitution of the patient. Hence peculiarities of local climate must be studied comparatively. Examples are relative humidity in different weather types at Bad Kissingen and Platz and comparisons of temperature, sunshine and cold fronts at Tölz and Waldeck. *Subject Headings:* **1. Medical climatology 2. Health resorts 3. Germany.**—*C.E.P.B.*

4.7–200 551.586:615.835

von Philipsborn, Ernst, **Klimakuren im Hochgebirge.** [Climatic cures in the high mountains.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:104–105, **1952.** 3 refs. **DWB**—The climatotherapeutic effects of resorts above 1200 m in Germany are summarized. *Subject Headings:* **1. Climatotherapy 2. Germany.**—*C.E.P.B.*

4.7–201 551.586:616

Becker, Friedrich, **Wettervorgänge und klinische Störungen.** [Weather processes and clinical disturbances.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:414–418, **1952.** 4 figs., table, 4 refs. **DWB**—An investigation technique for micrometeorological structure and bioclimagrams, developed at Königstein Bioclimatic Institute, is described. This confirms MÜGGE's relation between clinical disturbances and cyclogenetic processes. *Subject Heading:* **1. Medical meteorology.**—*C.E.P.B.*

4.7–202 551.586:616

Daubert, K., **Troposphärische Einflüsse bei der Entstehung der Thrombose und Embolie.** [Troposphere influences in thrombosis and embolism.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:418–425, **1952.** 4 figs., 3 tables, 37 refs. **DWB**—Material from German clinics is analyzed in relation to passage of fronts and occlusions, anticyclonic, transitional and cyclonic weather, processes in free air and dynamic weather types. Thrombosis occurs especially on edge of a high, with change from cold to warm troposphere, embolism inside highs, with laminar flow in a wide warm sector and especially in cyclonic activity. *Subject Headings:* **1. Medical meteorology 2. Heart diseases.**—*C.E.P.B*

4.7–203 551.586:628.8

†Leusden, F. Pels and Freymark, H., **Die Raumklimauntersuchung in der einfachen praktischen Anwendung an Hand von Beispielen.** [Investigation of room climate in simple practical application with examples.] *Naturwissenschaftliche Rundschau*, Stuttgart, 6(2):57–60, Feb. **1953.** 4 figs., 28 refs. **DWB**—Summary of literature. Important factors are temperature, humidity, air movement and number of occupants. Diagrams are drawn for

ood, moderate and bad conditions of temperature and R.H. for sitting persons for air move-ent below 0.2 and 0.2–0.3 m/s. Mapping of comfort of a room is described. *Subject Head-gs:* **1. Air conditioning 2. Comfort climate.**—*C.E.P.B.*

4.7–204 551.586:631.584.4

Aichele, Heinz, **Die klimatische Bedingungen für den Zwischenfruchtbau in Baden.** [The imatic conditions for secondary fruit growth in Baden.] *Germany. Deutscher Wetterdienst der US-Zone, Berichte*, No. 42:398–405, **1952.** 2 figs., 9 tables, 28 refs. **DWB**—Climatic ements and factors influencing possibility of catch crops are discussed. Pt. 1 deals with the owing period, winter cold and precipitation; Pt. 2 with climatic conditions for undersowing, ubble sowing and overwintering catch crops. *Subject Headings:* **1. Agricultural meteorology Baden, Germany.**—*C.E.P.B.*

UPPER AIR CLIMATOLOGY

4.7–205 551.587:551.589

Dammann, Walter, **Die Verbreitung der Höhentröge in der 500 mb-Fläche and ihr influss auf das Klima der gemässigten Breiten.** [The distribution of upper troughs in the 00 mb surface and their influence on climate of middle latitudes.] *Germany. Deutscher Vetterdienst in der US-Zone, Berichte*, No. 42:195–199, **1952.** 3 figs., 5 refs. **DWB**—Fre-uencies of upper troughs in 500 mb from U. S. Synoptic Charts are plotted for Northern emisphere (winter and summer) and represented by a schematic diagram. Climatic con-equences are discussed. *Subject Headings:* **1. Upper air climatology 2. Dynamic climatology.** -*C.E.P.B.*

ENVIRONMENTAL INFLUENCES

See also: **Interaction: vegetation—soil frost phenomena** (Benninghoff), 4.7–111; **Capture of fog particles by forest** (Ooura), 4.7–147; **Fog water content distribution around forest, Ochiishi, 1951** (Tabata and others), 4.7–151.

4.7–206 551.588:551.594.12

Martin, Thomas L., Jr., **Climate control through ionization.** *Franklin Institute, Journal*, 54(4):267–280, Oct. **1952.** 10 figs., 10 refs. **DWB**—It is believed that health and disease are nked to the number of positive or negative ions in the atmosphere as well as other weather actors. Several artificial sources of ions are listed, but only the hot wire and radioactive ources are considered practical for experimental purposes, since methods which produce ozone r which cause direct physiological effects will mask the effect of the ions. Apparatus used o produce ions by the hot wire method is described and illustrated. Difference in type of ion urrents produced by + and − ions, respectively, shown on recorder record. Positive ions roduce an extremely wide variation superimposed on a fairly steady component, whereas egative ions give a very steady record. The effect of atmospheric pollution in yielding ions analyzed. Effect of varying anode voltage, filament heating current, and of operating time nd space charge is also shown graphically and analyzed. The possibility of controlling ndoor climate by increasing ion content is developed. *Subject Headings:* **1. Climate control Indoor climates 3. Ion concentration.**—*M.R.*

4.7–207 551.588.1:06

Advisory Committee on Arid Zone Research. Meeting in London. *Nature*, London, 70(4339):1103–1104, Dec. 27, **1952. DWB**—Account of meeting of Sept. 29-Oct. 1, 1952, evoted to plans for organized research. *Subject Headings:* **1. Aridity 2. UNESCO Advisory ommittee on Arid Zone Research.**—*C.E.P.B.*

SYNOPTIC CLIMATOLOGY

4.7–208 551.589(09)

Schmauss, August, **Synoptik-Klimatologie.** [Synoptic climatology.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:1–2, **1952. DWB**—Reflections on develop-ent of synoptic climatology in Germany since 1905, with special reference to K. Knoch. *ubject Heading:* **1. Synoptic climatology.**—*C.E.P.B.*

4.7–209 551.589.1(43

Bürger, K., **Über die Temperaturen der Grosswetterlagen.** [On the temperatures of th general weather situations.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte* No. 42:146–154, **1952.** 3 figs., 4 tables, 15 refs. **DWB**—From 60 years of data at Bremen an Karlsruhe seasonal and monthly means of mean, maximum and minimum temperature an range are constructed for a number of synoptic weather types and studied statistically. *Subjec Headings:* **1. Synoptic climatology 2. Germany.**—*C.E.P.B.*

4.7–210 551.589.

Markgraf, Hans, **Wiederholung eines Witterungsablaufs in Nordwestdeutschland** [Repetition of a weather sequence in NW Germany.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte,* No. 42:293–299, **1952.** 3 figs., 3 tables. **DWB**—In NW Germany weather types of March 8–13, 1948, were repeated on 20–25. Five-hundred mb and surfac charts are reproduced and weather tabulated. *Subject Headings:* **1. Synoptic climatology 2. Germany.**—*C.E.P.B.*

MISCELLANEOUS APPLICATIONS

COSMIC INFLUENCES

See also: **Meteoric dust where Sikhote-Alinsk iron meteoric rain fell** (Krinov, Fonton), 4.7–61.

4.7–211 551.590.22

Schindler, Gerhard, **Mond und Wetter.** [Moon and weather.] *Zeitschrift für den Erdkundeunterricht,* Berlin, 2(4):171–175, **1950.** Abstracted from reprint. **DWB**—Various popular notions ascribing to the moon an effect upon weather, the possible phenomena that may have given rise to such a conclusion, the insignificant gravitational and radiational effect of the moon upon the earth's atmosphere and various attempts to associate temperature, rainfall, cloudiness, storms, etc. with phases of the moon (Ludicke, K. B. Mack Dowell (*sic*), Ventosa, Beyerlein) are discussed. The author concludes that there is no evidence that the moon has any effect upon weather processes. *Subject Heading:* **1. Lunar influences.**—*I.L.D.*

4.7–212 551.590.24:523.78

Blum, Émile-Jacques, Denisse, J. F. and Steinberg, J. L., **Résultat des observations d'une éclipse annulaire de soleil effectuées sur 169 Mc/s et 9,350 Mc/s.** [Observational results of the effects of an annular solar eclipse at the frequencies of 169 Mc/s and 9.350 Mc/s.] *Annales d'Astrophysique,* 15(2):184–198, **1952.** 8 figs., 8 refs. **DWB**—The results of observations with 3.2 and 178 cm wavelength during the solar eclipse of Sept. 1, 1951 in the French Sudan are presented and discussed. At 3.2 cm the distribution of luminosity increases toward the limb of the disk. At 178 cm the apparent diameter of the sun by far surpasses the apparent optical diameter, and the distribution of luminosity is not symmetrical. *Subject Headings:* **1. Solar eclipses 2. Solar radiation 3. French Sudan.**—*W.N.*

4.7–213 551.590.25:551.510.5

†Whipple, Fred L., **Meteoritic phenomena and meteorites.** (In: U. S. School of Aviation Medicine, Randolph Field, Texas, **Physics and medicine of the upper atmosphere.** Albuquerque, **1952.** p. 137–170. figs., tables, 51 refs., eqs.) **DLC**—This paper is concerned with the interaction of meteorites and meteors with the upper atmosphere by radiation, by electrons producing radar reflections and by night sky radiation, all of which measure the physical state of the upper atmosphere, and with the interaction of meteoritic particles with aircraft or occupants of aircraft. The following topics are covered: meteorite craters and the chemical and physical properties of meteorites, the brightness, velocities and orbits of meteors, micro-meteorites, interplanetary gas; the basic theory underlying the methods for determining upper atmospheric densities from photographic observations of meteors, upper atmospheric densities obtained by these methods; the meteoritic penetration of high altitude vehicles including chances of meteoritic encounter, the masses and intensities of meteoroids, meteoritic penetration and

afety precautions against meteoritic penetration. *Subject Headings:* **1. Meteorites 2. Meeors 3. Upper atmosphere.**—*I.L.D.*

OPTICAL PHENOMENA

4.7–214 551.593.55

Sato, Takao (*Nagasaki Univ.*), **Studies on the twilight by the scattering.** *Tohoku Uniersity, Science Reports, 5th Ser., Geophysics*, 3(3):114–129, Dec. **1951.** 8 figs., 9 tables, 6 refs. **MH-BH**—An elaborate treatment of the mathematical problem of primary, secondary and otal scattering, with numerous illustrations and tables which can be used in calculations. The horizontal intensity of twilight is considered, and an example of method of computation iven. Tables show values for primary, for secondary, for total scattering, for ratio of primary o secondary, for radiation due to total scattering falling on a horizontal plane for several wave engths with different transmission coefficients and solar diffusions, and for total scattering ver a 200 Å band, etc. *Subject Headings:* **1. Twilight sky brightness 2. Scattering of light.**—*M.R.*

4.7–215 551.593.55:551.521.16

Sato, Takao, **Über die Dämmerungserscheinungen auf der Erde überhaupt.** [On the henomena of twilight on the earth in general.] *Tohoku University, Science Reports, 5th Ser., Geophysics*, 3(1):1–12, April **1951.** 4 tables, 9 eqs. **DWB**—For use in reporting twilight henomena the author defines: 1) day and night, 2) day and bright night, 3) continuous day,) continuous night with twilight, 5) dark night and 6) continuous bright night. The beginning, end, duration and geographical distribution are calculated in detailed manner for each henomenon. *Subject Headings:* **1. Twilight sky brightness 2. Twilight duration 3. Daylight illumination.**—*I.L.D.*

ELECTRICAL PHENOMENA

See also: **Radar cloud detection** (Gould), 4.7–25; **Method of investigating ion spectra in atmos.** (Fedorov), 4.7–41; **Cloud droplet electrification in nonprecipitating cumuli** (Gunn), 4.7–42; **Climate control through ionization** (Martin), 4.7–206.

4.7–216 551.594

Reiter, R., **Luftelektrisch-synoptische Untersuchungen im Alpenraum.** [Synoptic tmospheric electric investigations in the Alpine region.] *Germany. Deutscher Wetterdienst n der US-Zone, Berichte*, No. 42:87–91, **1952.** 5 figs., table, 8 refs. **DWB**—A network of 4 alley and 2 mountain stations for research purposes is described for recording static field and urrent, and some specimen records reproduced and discussed. *Subject Headings:* **1. Atmospheric electricity 2. Alps.**—*C.E.P.B.*

4.7–217 551.594

†Wormell, Thomas Wilson, **Reviews of modern meteorology—8. Atmospheric electricity; ome recent trends and problems.** *Royal Meteorological Society, Quarterly Journal*, 79(339):3–8, Jan. **1953.** 4 figs., 6 tables, 91 refs., 8 eqs. **DWB**—This comprehensive survey opens with summary of the vertical electric field and downward current in the atmosphere in fine weather nd theories of their variations. It studies the electric fields and field changes produced at the arth's surface by thunderstorms and lightning, the electrical structure of a CuNb cloud, ertical currents due to thunderclouds and the balance sheet of the earth's charge. The eneration of charges in a thundercloud is discussed in detail, including evolution of the cloud, ocation of charge separation, theories of the processes and their quantitative evaluation, lectrification by breaking of water drops and friction of ice crystals, and significant effects of oexistence of water and ice, especially of riming associated with formation of hail or graupel. harge on rain in strong electric fields is discussed. Finally, the present state of knowledge assessed, the main problem now being the source of thunderstorm electrification. *Subject eadings:* **1. Atmospheric electricity 2. Lightning 3. Electrical charges on raindrops.**—*E.P.B.*

4.7–218 551.594.12:551.510.535

Bates, D. R., **[Symposium on] the characteristics of and processes in ionized media.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 12:40–59, **1952.** figs. **DWB**—The following topics were discussed in some detail: 1) the recombination coefficient in the E layer and higher layers, 2) the actual ions present in these layers, 3) persistence of basic ionization for abnormally long periods of time and 4) production of secondary ionization. *Subject Headings:* **1. Ionized media 2. Ionosphere.**—*W.N.*

4.7–219 551.594.12:551.574.1:621.315.05

Pauthenier, Marcel (*Dir. Lab. des Hautes Tensions*) and Cochet, R., **Contribution à l'étude des pertes dans les lignes de transport d'énergie électrique à haute tension continué par brouillard.** [Contribution to the study of leakage in high tension direct current electrical transmission lines during fog.] *France. Centre Nationale de la Recherche Scientifique, Journal des Recherches*, No. 15:337–342, **1951.** diagrs., graphs, refs., eqs. **MH-BH**—Drops of water forming on the high tension electrical lines during fog, emit ions which rapidly dissipate the electrical energy. It is necessary to know the amount of water deposited each second on the line, and the minimum quantity of water necessary to start ionization: first, the situation in the absence of water, then with water present but no wind, then with winds of certain direction and force. The calculated trajectories of droplets are compared with a photographic model of a cylinder with fog drops blowing past. A numerical example gives 26 minutes in still air and 10 with wind of .4 m/sec for ionization to begin. *Subject Headings:* **1. Transmission lines 2. Ionization by fog.**—*M.R.*

4.7–220 551.594.22:621.316.9

Fritsch, Volker (*Vienna*), **Schutz hochgelegener Baustellen gegen Blitzschläge.** [Protection of high lying buildings against lightning.] *Österreichische Zeitschrift für Elektrizitätswirtschaft*, 5(2):41–47, **1952.** 5 figs., table, eqs. Abstracted from reprint. **DWB**—Investigations based on damage done during two lightning catastrophes involving explosions which occurred in Austria (Vorarlberg and Tirol) on the 18th of June, 1948, 13 September 1949 and 15 July 1949. Geoelectric as well as meteorological (synoptic) conditions and recommendation for prevention of the damage are presented. *Subject Headings:* **1. Lightning damage 2. Lightning protection 3. Explosions 4. Austria.**—*M.R.*

4.7–221 551.594.22:616:69

Hamilton, Andrew, **44,000 storms a day breed lightning.** *Popular Science*, New York, 161(2):132–135, 232, 234, 236, Aug. **1952.** 6 figs. **DLC**—Statistical figures on the frequency of lightning and on damage it causes to life and property are given. A few cases in which individuals were struck by lightning under unusual circumstances are related. Physics of thunderstorms and lightning strokes are summed up in a popular manner. A thunderstorm diagram and photographs showing lightning and its effects are presented. *Subject Headings.* **1. Lightning frequencies 2. Lightning damage.**—*G.T.*

4.7–222 551.594.221:621.315/6

Forrest, John Samuel (*British Electricity Authority*). **The performance of the British grid system in thunderstorms.** *Institution of Electrical Engineers, London, Proceedings*, 97, Pt. II(57):345–364, June **1950** and Pt. II(60):835–854, Dec. **1950.** figs., tables, 20 refs. Abstracted from reprint. **DLC**—A description of the system is given and records of faults due to lightning, 1934–47, are analyzed. In spite of the extent (several thousand miles) of the system, annual faults varied from 40 to 119 (no relation to sunspots); 46% caused interruption of supply. Fault rate/100 mi/year decreased from 5 on 22 and 11 KV lines to 1 on 132 KV. Maximum frequency July and 16–17 h, minimum Nov.–March and 7–9 h. Geographical variation not related to number of thunder days. An average Grid substation had one fault due to a direct strike in 70 years. Factors of design discussed include tower foot resistance, protective and warning devices. The extensive discussions include a statement by S. Morris Bower on diurnal and annual variation of thunderstorm frequency; fault data for other

countries; and numerous technical questions. *Subject Headings:* **1. Lightning 2. Lightning protection.**—*C.E.P.B.*

AURORAS

4.7–223 551.594.5

Lebedinskiĭ, A. I., **Luchistye i dugovye formy poliarnykh siianiĭ.** [Auroral rays and arcs.] *Akademiia Nauk, SSSR, Doklady*, 86(5):913–916, **1952.** figs., 9 refs., 3 eqs. **DLC**—Proposes a general theory of auroras, explaining auroral rays by the excitation of molecules and shaped auroral arcs by the excitation of ions alone. *Subject Headings:* **1. Auroral theories 2. Auroral rays 3. Auroral arcs.**—*A.A.*

4.7–224 551.594.51

Meinel, Aden B. (*Yerkes Obs.*), **Science takes a look at the Northern Lights.** *U. S. Office of Naval Research, Research Reviews*, Sept. **1951.** p. 1–6. 3 figs., refs. **DWB**—A popular account of research on the aurora borealis carried on under the auspices of the ONR. This research was centered on the near infrared region of the spectrum. The special optical apparatus devised for this research, namely a F/0.8 flat-field Schmidt type camera, is described. The spectra obtained have confirmed the hypothesis that the aurora is caused by the entry of energetic particles, such as radiating hydrogen atoms, into the atmosphere. Also a new band system was identified from the ionized nitrogen molecule. Studies of the airglow revealed that strong emissions in the red and infrared airglow regions were shown to be due to the OH molecule. *Subject Headings:* **1. Aurora borealis 2. Infrared region 3. Auroral spectra.**—*I.L.D.*

4.7–225 551.594.51

Nicholls, R. W., **Intensity measurements of molecular spectra. 1. Spectroscopic intensities and photographic blackening.** London, Ontario. University of Western Ontario. Dept. of Physics, Contract AF 19(122)-470, Scientific Report, No. 1, Oct. 22, **1952.** 16 p. 3 figs., 2 tables, 6 refs., 13 eqs. **DWB**—A method is described which allows meaningful information pertaining to source condition to be derived directly from microdensitometer traces of spectra of the source in question. It is not intended to supplant the unquestioned superior, though more laborious, method of photographic photometry normally required before photographic spectra can be interpreted from an intensity standpoint. Rather it is proposed as a useful survey method that can be applied relatively rapidly to plates taken from various source conditions. When usual excitation conditions are shown probably to exist by this method, then a full photometric study can be made. In addition to the density measurements, the method also requires some knowledge of the fractional transition probabilities involved in the transition, which for bands of auroral interest are becoming available. *Subject Headings:* **1. Auroral spectrum measurement 2. Spectrograph calculation. I. London, Ontario. University of Western Ontario. Dept. of Physics II. Contract AF 19(122)-470.**—*Author's summary.*

RADIO METEOROLOGY

4.7–226 551.594.7:016:535.2

†Cornell University. School of Electrical Engineering, **Bibliography of report on tropospheric propagation.** Contract AF 33 (038)-1091, Final Report, Part 1, April 1, **1951.** Each section renumbered. **DLC**—A thoroughly annotated bibliography of 867 reports on 17 phases of troposphere radio propagation from numerous American, British, Australian, Canadian and New Zealand sources from 1930 to 1949. The only sources other than those from the English language that have been abstracted are those which have been translated by such agencies as CADO and NACA. The abstracts are thorough and contain essential information and theory. A detailed subject and author index is provided. The meteorological theory and instrumentation, effect of temperature and humidity inversions, hills, trees, storms, polarization, etc. are all given proper emphasis. The term Radio climatology is introduced here. *Subject Headings:* **1. Tropospheric propagation 2. Radio wave propagation 3. Radio climatology 4. Bibliographies. I. Contract AF 33 (038)-1091.**—*M.R.*

4.7–227 551.594.7:621.396.11

Friedman, Bernard, **Propagation in a non-homogeneous atmosphere.** *Pure and Applied Mathematics*, 4(2/3):317–350, Aug. **1951.** 3 figs., 16 refs., 96 eqs. **DWB**—Two previous approaches to the problem of microwave propagation around the earth (that of WATSON, RYDBECK and others, and that of PRYCE, BOOKER, FURRY and PEKERIS) are reviewed. In this substantial theoretical paper, a third fundamental assumption is used as an approach. Starting with Maxwell's equations, the theory is developed for propagation in an inhomogeneous atmosphere where the dielectric constant is radially stratified. This allows treatment for a uniform and a nonuniform atmosphere, and results compare favorably with those obtained for a "flat earth" by the W.K.B. method, except where large distances exist between transmitter and receiver. Finally, the theory is applied to an atmosphere containing a duct, and a comparison made between the previous theory based on a magnetic dipole, and the corresponding equations for an electric dipole. *Subject Headings:* **1. Microwave propagation 2. Radio transmission ducts.**—*M.R.*

4.7–228 551.594.7:551.501.8:551.515.2(265)

*Kimpara, Atsushi (*Nagoya Univ.*), **The typhoon Kezia and atmospherics.** *Imperial Academy, Tokyo, Proceedings*, 27(7):366–370, July **1951.** table, fig. In English. **DWB.** Also: *Journal of Geomagnetism and Geoelectricity*, 3(2):25–31, July **1951. DWB**—Referring to his study on atmospherics carried on since 1928, the author offers some data and conclusions reached in his recent investigations of the correlation between frequency of atmospherics and aerological conditions at 3 km. He finds that sources of atmospherics are mainly scattered over the area of conditional instability in which frontal thunderstorms or air-mass thunderstorms may develop. Data on the distribution of sources of sferics in the neighborhood of the typhoon Kezia are presented in a table and found to follow a pattern similar to those observed during the typhoon Kitty, and to coincide with the movement of various air masses. *Subject Headings:* **1. Sferics 2. Typhoons 3. Thunderstorms 4. Western Pacific Ocean.**—*G.T.*

4.7–229 551.594.7:621.396.11

Ratcliffe, J. A. (*Cambridge, Eng., Cavendish Lab.*), **The propagation of long and very-long waves.** *U. S. Air Force Cambridge Research Laboratories, Geophysical Research Papers*, No. 7:17, Dec. **1950. DWB**—A short abstract of the paper presented on the Conference on Ionospheric Research in June 1949. The daytime downcoming wave on 16 kpc is strong (summer reflection coefficient $r=0.15$) but on 100 kpc it is weak ($r=0.01$). *Subject Heading:* **1. Long wave propagation.**—*A.A.*

4.7–230 551.594.7:621.396

Satyanarayana, R. and Khastgir, S. R. (*Banaras Hindu Univ., Banaras*), **Polarization of down-coming wireless waves of medium wavelengths.** *Journal of Scientific and Industrial Research, Ser. B*, 11(6):211–215, June **1952.** 6 figs., table, 3 refs. **DWB**—Investigations at selected radio station in India showed that: 1) only ordinary waves were received, 2) the polarization was lefthanded and elliptical, at times turning into a straight line or a circle and 3) the ratio of normal to abnormal component and the phase difference between these components varied randomly with time. *Subject Headings:* **1. Angels 2. Radio wave propagation 3. Polarization.**—*W.N.*

4.7–231 551.594.7 551.510.52:621.396.8

Schulkin, M., **Average radio-ray refraction in the lower atmosphere.** *Institute of Radio Engineers, New York, Proceedings*, 40(5):554–561, May **1952.** 7 figs., 2 tables. **DLC**—Presents empirical results (accompanied by many useful curves) of computations for a range of climatological conditions in North America, of the bending of rays that pass entirely through the atmosphere and arrive or depart tangentially to the earth's surface. Ninety per cent of the ray bending occurs in the lowest 10 km of the atmosphere. The results are compared with the standard refraction approximation and it is found that although in the average case there is fairly good agreement, the deviation from the true refraction is large both as a function of altitude and of geographical location. Most of the curves are based on data for Washington,

D. C. *Subject Headings:* **1. Microwave propagation 2. Tropospheric refraction 3. Microwave efraction 4. Washington, D. C. 5. North America.**—*W.N.*

ASTROPHYSICS

4.7–232 523:551.501.9

Goldberg, Leo, **The analysis of the solar and terrestrial atmospheres.** *American Academy f Arts and Sciences, Boston, Proceedings*, 79(4):238–253, July 1951. 9 figs. **DWB**—A escription of the more important aspects of the solar research program carried out at the McMath-Hurlburt Observatory, University of Michigan, is given. This program covers:) structure of the solar atmosphere which includes measurement of solar bursts darkening,) studies of sunspots, dark filaments, etc. and 3) studies of infrared solar spectrum. Descrip- ions of the various phenomena and of the equipment of the observatory are given. *Subject Headings:* **1. Solar research 2. Solar atmosphere 3. McMath-Hurlburt Observatory, Pontiac, Mich.**—*I.L.D.*

PART II. ANNOTATED BIBLIOGRAPHY ON THE JET STREAM

By: *Gwynne J. Evans* and *Mollie P. Kramer*

INTRODUCTORY NOTE

The following bibliography is the third in a series of three on High Level Winds appearing in Meteorological Abstracts and Bibliography. For references to winds in the 500–100 mb level see the May 1953 issue of this journal; for upper stratospheric and ionospheric winds (above 100 mb) see the June 1953 issue. The Subject Outline below will guide the reader to papers on the theory, physical characteristics, applications and observational techniques of the jet stream.

It is not uncommon for studies of the general circulation to include observational data and theoretical explanations of the jet stream without any mention of that phenomenon in the titles. In compiling the bibliography below we realize that we have unintentionally overlooked a number of such papers and would appreciate it if readers would bring such omissions to our attention.

We wish to express our appreciation to Mr. Jerome Namias and Mr. Jay S. Winston of the U. S. Weather Bureau Extended Forecast Section for their valuable suggestions and cooperation in the preparation of this bibliography.

SUBJECT OUTLINE

General and Theoretical Studies
- General works
  - Jet stream history, 4G–5, –6, –32, –47, –84, –117, –118
  - Classical and background works, 4G–2, –16, –19, –22, –24, –25, –27, –28, –31, –37, –38, –51, –52, –65, –75, –77, –78, –86, –93, –101, –103, –108, –112, –124
- Theories of the jet stream
  - Horizontal mixing theory (Rossby), 4G–16, –19, –27, –31, –51, –70, –83, –84, –100, –109, –112
  - Confluence theory (Namias and Clapp), 4G–7, –22, –63, –84, –109, –119
  - Analogy to ocean jets, 4G–4, –6, –44, –55, –69, –77, –93
  - Long wave theory, 4G–9, –30, –31
  - Solar radiation and sunspot theory, 4G–41, –59
- Dynamics of the jet stream, 4G–45, –48, –53, –54, –65, –66, –79, –86, –93, –100, –101, –105, –110, –112
  - Jet stream models, 4G–111, –122
  - Deviation from geostrophic winds, 4G–11, –17, –37, –46, –55

Physical Characteristics of the Jet Stream
- Latitudinal position, 4G–5 to –7, –10, –17, –24, –30, –34, –36, –46, –50, –52, –64, –71, –87, –95, –97 to –99, –101, –102, –104, –106, –112, –123
  - Relation to Polar Front, 4G–14, –75, –83, –125
- Height, 4G–1, –3, –5 to –7, –10, –15, –17, –18, –39, –46, –78, –88, –92, –95 to –98, –104, –116, –123
- Direction, 4G–18, –20, –35, –92, –116, –123, –129
- Speed, 4G–1, –3, –10, –17, –18, –20, –25, –30, –48, –78, –87, –88, –92, –95 to –99, –102, –116, –123, –129
- Seasonal variation, 4G–71, –73, –126
  - Position, 4G–52, –101, –104
  - Strength, 4G–96, –123
- Irregular variations, 4G–36, –73
  - Splitting, 4G–28, –71, –96, –122
  - Southward progression, 4G–50
- Velocity variation with height (vertical wind shear), 4G–34, –46, –51, –87, –108
  - Relation to vertical motion in the stratosphere, 4G–12, –111
- Relation to horizontal wind field, 4G–108
- Relation to pressure pattern aloft, 4G–30, –40, –42, –57, –89, –129
- Relation to temperatures aloft, 4G–12, –19, –84, –125
  - Relation to tropopause, 4G–6, –12 to –14, –19, –43, –48, –58, –74, –80, –90, –94, –102, –125
- Relation to cloud formation, 4G–81, –128
- Relation to general circulation, 4G–16, –28, –32, –34, –38, –42, –45, –51, –52, –56, –65, –72 to –75, –79, –82, –86, –88, –106, –107, –110, –113, –121, –124, –125

Applications
- Flight, 4G–62, –67, –82
  - Navigation, 4G–20, –35, –37
  - Turbulence, 4G–21, –31, –40, –60, –61, –103, –105, –120, –132
- Associated synoptic conditions
  - Cyclogenesis, 4G–15, –24, –25, –113, –127

Frontogenesis, 4G–7, –23, –49, –84, –113, –127
Surface fronts, 4G–25, –26, –33, –67, –114
Steering, 4G–8, –29, –57
Blocking, 4G–53, –66
Precipitation, 4G–57, –87, –94, –127
Cold or heat waves, 4G–18, –107
Forecasting, 4G–8, –9, –23, –29, –32, –91, –111, –115, –127, –128, –132
Observation and Computational Techniques
Pilot balloons and other balloons, 4G–1, –3, –104
Electronic equipment
Radar, Rawin, Rawinsonde, 4G–57, –76, –92, –116, –123
Radiosonde, 4G–12, –76, –97, –123
Kites and gliders, 4G–105
Pilot reports, 4G–20, –21, –62, –129
Pressure distribution, 4G–1, –6
Cross sections, 4G–5 to –7, –10, –11, –13, –14, –18, –22, –34, –43, –46, –57, –68, –75, –76, –78, –82, –83, –85, –96, –99, –102, –108, –124, –126

GEOGRAPHICAL OUTLINE

Africa
East Africa, 4G–92
Asia
China, 4G–57
India, 4G–34, –104
Northern India, 4G–125
Iraq, 4G–94
Japan, 4G–70, –71, –82, –85
Tokyo, 4G–17
Southeast Asia, 4G–113
U.S.S.R.
Siberia, 4G–34
Australasia
Australia, 4G–96
New Zealand, 4G–76, –123
Europe
British Isles, 4G–11
England, 4G–21
Scotland, 4G–21, –97
Hungary
Budapest, 4G–3
Western Europe, 4G–11
North America, 4G–29, –50, –91
United States, 4G–107, –121
Eastern United States, 4G–129
Antarctica, 4G–38
Oceans, Seas and Islands
Atlantic Ocean
Denmark Strait, 4G–39
Pacific Ocean, 4G–87
Hawaiian Islands, 4G–87
Southwest Pacific, 4G–43, –46, –99
Western Pacific, 4G–70, –124
Northern Hemisphere, 4G–59
Southern Hemisphere, 4G–38, –43, –106, –123

BIBLIOGRAPHY ON THE JET STREAM

1925

4G–1 551.557

Durward, J., **The investigation of the winds in the upper air from information regarding the place of fall of pilot balloons and the distribution of pressure.** *Great Britain. Meteorological Office, Professional Note,* No. 42, **1925.** 14 p. 8 figs. M.O. 273b. **DWB**—Balloons released from co-operating stations in 1923 carried an attached card requesting finders to fill in date and time of finding. From this data, assuming balloons reached heights of between 30,000 and 40,000 ft, upper winds are investigated. Cases of very high winds noted. One balloon travelled 570 mi (Croydon-Leipzig) in 4 hrs, and supporting evidence of high cloud movement and pilot balloon ascents showed that an exceptionally high wind must have been encountered between 25,000 and 35,000 ft. Average speed of 188 mph estimated between these levels. *Subject Headings:* **1. Upper air winds 2. Jet stream speed 3. Jet stream height.**—*G.J.E.*

1933

4G–2 532.5(02) 551.5(02)

Bjerknes, V., Bjerknes, J., Solberg, H. and Bergeron, T., **Physikalische Hydrodynamik, mit Anwendung auf die dynamische Meteorologie.** [Physical Hydrodynamics with applications to dynamical meteorology.] Berlin, J. Springer, **1933.** 797 p. 151 figs., tables, eqs. **DLC**—Treatise divided into 2 parts, first being largely devoted to theoretical hydrodynamics and the second to meteorological applications. Latter part opens with a treatment of the mean state of the atmosphere in which the surface and upper air temperature, pressure, solenoidal and wind fields are considered. *Subject Headings:* **1. Hydrodynamics 2. Upper air winds.**—*G.J.E.*

4G–3 551.557

Tóth, Géza, **Szokatlanul nagy szélsebesség a szabad légkörben Budapest felett.** [Extraordinary speed of upper wind observed at Budapest.] *Időjárás,* Budapest, 37:91, **1933.** German

abstract p. 101. **DWB**—On July 5, 1933 a pilot balloon ascent showed a wind speed of 50–55 m/sec between 7 and 9.3 km. *Subject Headings:* **1. Jet stream speed 2. Budapest.**—*G.J.E.*

1936

4G–4 551.465

Rossby, C.-G., **Dynamics of steady ocean currents in the light of experimental fluid mechanics.** *Papers in Physical Oceanography and Meteorology*, Cambridge, Mass., 5(1), Aug. **1936.** 43 p. 26 figs., 2 charts, 21 refs. **DWB**—Provides a background for a study of atmospheric jet streams because of their resemblance to the larger ocean currents. *Subject Headings:* **1. Ocean currents 2. Jet stream analogies.**—*G.J.E.*

1944

4G–5 551.5(02)

Willett, H. C., **Descriptive meteorology.** New York, Academic Press Inc., **1944.** 310 p. 52 figs. **DWB**—In Chap. VI author presents for first time mean cross sections showing jet stream. Importance of phenomenon not fully indicated. *Subject Headings:* **1. Textbooks 2. Jet stream profiles.**—*G.J.E.*

1947

4G–6 551.513.2:551.557

Chicago. University. Dept. of Meteorology, **On the general circulation of the atmosphere in middle latitudes. A preliminary summary report on certain investigations conducted at the University of Chicago during the Academic Year 1946–47.** *American Meteorological Society, Bulletin*, 28(6):255–280, June **1947.** 24 figs., 20 refs. **MH-BH**—Earlier references show occurrences of strong winds in upper air had been noted previously. This paper is first to discuss these strong winds in detail. The term "jet stream" introduced here to signify a fairly narrow stream of extremely strong west-wind circulation at levels between 5 km and 15 km above sea level with maximum intensity at tropopause level. Vertical cross sections and 500 mb contour charts used to investigate jet stream and its relationship to other atmospheric phenomena. Comparison made with Gulf Stream. It is assumed that jet stream encircles earth as a meandering current. Strength said to decrease with increasing latitude. At its most southerly limit between 35° and 30°N it is expected to reach values in excess of 250 m.p.h. *Subject Headings:* **1. Atmospheric circulation 2. Jet stream.**—*G.J.E.*

4G–7 551.513.2:551.557

Namias, J., **Physical nature of some fluctuations in the speed of the zonal circulation.** *Journal of Meteorology*, 4(4):125–133, Aug. **1947.** 16 figs., 10 refs. **DWB**—Presents mean meridional cross section for July for Northern Hemisphere showing a center of maximum velocity at a height of about 12 km between 40°N and 45°N. Gives examples of jet stream forming at the confluence of warm and cold air in frontogenetical situations and thus provides an alternative to Dr. Rossby's vorticity theorem. *Subject Headings:* **1. Zonal circulation 2. Jet stream height.**—*G.J.E.*

4G–8 551.509.317:551.557

Oliver, V. J., **The forecasting significance of high level winds in sub-Arctic regions.** *American Meteorological Society, Bulletin*, 28(1):9–14, Jan., **1947.** 4 figs., 4 refs. **DWB**—Paper published prior to introduction of term "jet stream" but illustrates a NW'ly jet ahead to the north of a depression moving NE and a SW'ly jet in the rear. The large changes of wind direction and speed were observed and used as tools for forecasting movement of depressions. *Subject Headings:* **1. Upper air winds 2. Jet stream 3. Forecasting techniques.**—*G.J.E.*

1948

4G–9 551.509.317:551.513.2:551.515:551.557

Cressman, G. P., **On the forecasting of long waves in the upper westerlies.** *Journal of Meteorology*, 5(2):44–57, April **1948.** 18 figs., 11 refs. **DWB**—Suggests that jet streams occur when upper flow exhibits a long wave-length and are responsible for an increase in wave number. Realization of inertia instability south of jet stream may be mechanism by which this increase in wave number is achieved. He concludes that, for successful forecasting, upper air charts must be large enough to show several of the long waves. *Subject Headings:* **1. Forecasting techniques 2. Waves in the westerlies 3. Jet stream theory.**—*G.J.E.*

4G–10 551.506.7:551.557

Hess, S. L., **Some new mean meridional cross-sections through the atmosphere.** *Journal of Meteorology*, 5(6):293–300, Dec. **1948.** 4 figs., 6 refs. **DWB**—Data for stations within a narrow band about the 80°W meridian are given and used to construct mean summer and winter meridional cross sections. Strong maxima of west winds are seen at 35°N in winter with a secondary maximum

above 12 km at 55°N, and at 55°N in summer, with a secondary maximum further south which is possibly the result of a tendency for the primary maximum to establish itself intermittently at a much lower latitude than the normal. Previously observed daily locations of the jet stream are thus seen in the mean flow. *Subject Headings:* **1. Upper air observation 2. Jet stream profiles 3. Meridional cross sections 4. Jet stream location.**—*G.J.E.*

4G–11 551.506.7:551.557

Hovmöller, E., **North–south cross section showing distributions of temperature, relative humidity and wind in a well-marked zonal current over Western Europe.** *Journal of Meteorology*, 3(2):67–69, April **1948.** 2 figs., 2 refs. **DWB**—Situation over British Isles and Western Europe, 9–11 November 1947, examined. North–south cross section through jet stream shows observed winds in close agreement with calculated geostrophic winds for Lerwick, Leuchars and Liverpool. Observed values from Larkhill were 25–50% higher than might be expected. *Subject Headings:* **1. Jet stream profiles 2. Geostrophic winds 3. British Isles 4. Western Europe.**—*G.J.E.*

4G–12 551.513.1:551.557

§Palmén, Erik, **On the distribution of temperature and wind in the upper westerlies.** *Journal of Meteorology*, 5(1):20–27, Feb. **1948.** 6 figs., 11 refs., 10 eqs. **DWB, DLC**—Fundamental paper on existence and nature of narrow band or "meandering" river of strong westerly winds in middle latitudes which exists on daily upper-air charts and cross sections, but does not show up on mean monthly charts. Radiosonde data for all of North America used to demonstrate or derive temperature-wind characteristics and stability of the "jet stream," its relation to air masses, tropopause surfaces and vertical motions in the stratosphere. Stratosphere is very cold (−70°C) in winter over the Arctic, whereas between 50° and 60°N the highest temperatures occur (similar conditions have been found over Europe). There is a zone of lowest temperature about 4° of latitude south of the "jet stream" zone and the zone of highest temperature is about 7° north of this zone. (For Meteorological Office discussion *see Meteorological Magazine*, London, 78(919):16–23, Jan. 1949.) (*Same item as* 5–42, May 1950, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Jet stream 3. Synoptic aerological studies.**—*M.R.*

4G–13 551.524.7:551.557

Palmén, Erik and Nagler, K. M., **An analysis of the wind and temperature distribution in a free atmosphere over N. America in a case of approximately westerly flow.** *Journal of Meteorology*, 5(2):58–64, April **1948.** **DWB**—Mean cross section drawn for special situation with approximately westerly flow over N. America and seen to exhibit normal jet stream characteristics. Tropopause seen to have a distinct multiple structure. Stability of the jet discussed. *Subject Headings:* **1. Upper air observation 2. Jet stream 3. Tropopause.**—*G.J.E.*

4G–14 551.515.8:551.524.7:551.557

Palmén, Erik and Newton, C. W., **A study of the mean wind and temperature distribution in the vicinity of the polar front in winter.** *Journal of Meteorology*, 5(5):220–226, Oct. **1948.** 5 figs., 4 refs. **DWB**—Twelve individually analyzed daily cross sections showing well-marked cold fronts used to construct a mean cross section. Strong baroclinity shown not only in frontal layer but also in warm and cold air above and below. Mean jet shows up so distinctly in the cross-section that the deviation with respect to the frontal zone must be small in each case. Mean horizontal shear pattern discussed in relation to the absolute vorticity pattern particularly with regard to the strong anticyclonic shear and low absolute vorticity found south of the jet near the tropopause. *Subject Headings:* **1. Polar fronts 2. Upper air winds 3. Jet stream 4. Cross sections.**—*G.J.E.*

4G–15 551.515.11:551.557

§Riehl, Herbert, **Jet stream in upper troposphere and cyclone formation.** *American Geophysical Union, Transactions*, 29(2):175–186, April, **1948.** 8 figs., 11 refs. **DWB**—Riehl examines cases of relatively straight westerly flow to find criteria linked with cyclogenesis. Warm band in polar stratosphere to the north and cold band in tropical troposphere to the south, with reversal of normal meridional temperature gradient above the jet are illustrated by 200 mb chart. Vertical motions generated in jet considered responsible. Synoptic example used to demonstrate proposition that superposition of jet stream on the frontal zone does induce cyclone formation providing there is only small streamline curvature aloft and an abnormally large wave-spacing in the westerlies. *Subject Headings:* **1. Cyclogenesis 2. Jet stream.**—*G.J.E.*

4G–16 551.513.2:551.557

Rossby, C.-G. and Willett, Hurd C., **The circulation of the upper troposphere and lower stratosphere.** *Science*, New York, (108):643–652, Dec. **1948.** 13 figs., 6 refs. **DWB**—Elementary presentation of existing knowledge which includes a non-mathematical explanation of Rossby's

work on relationship between jet stream and general circulation. *Subject Headings:* **1. Atmospheric circulation 2. Jet stream theory.**—*G.J.E.*

4G–17 551.557

Treloar, H. M., **Extreme winds in high levels.** *Weather Development and Research Bulletin*, Melbourne, 10:15–18, 20, June **1948.** 9 refs. **DWB**—Wind speeds exceeding 150 m.p.h. in the 7–12 km layers tabulated, highest being over Tokyo in winter-time, 270 m.p.h. at 9 km. Latitude effect discussed and equivalent winds calculated for latitude 60° assuming winds are geostrophic. Strongest is that related to a British observation of 215 m.p.h. which reduced to 177 m.p.h. at latitude 60°. *Subject Headings:* **1. Upper air winds 2. Jet stream speed 3. Tokyo, Japan.**—*G.J.E.*

1949

4G–18 551.513.1:551.557

Berggren, R., Bolin, B. and Rossby, C.-G., **An aerological study of zonal motion, its perturbations and breakdown.** *Tellus*, Stockholm, 1(2):14–37, May **1949.** 26 figs., 22 refs. **DWB**—Paper analyzes a series of frontal waves associated with a strong zonal current over Europe. North–south cross sections show jet stream varying in height, direction and strength with passage of successive troughs, its speed being 50–100% greater at such times than between troughs. Cross section shown of easterly jet formed to the S.E. of a blocking anticyclone and its features discussed. *Subject Headings:* **1. Atmospheric circulation 2. Blocking waves 3. Jet stream profiles 4. Cross sections 5. Easterly jet stream.**—*G.J.E.*

4G–19 551.513.2:551.557

Defant, Albert, **Neuere Ansichten über die allgemeine Zirkulation der Atmosphäre in mittleren Breiten.** [Recent views on the general circulation of the atmosphere in middle latitudes.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 1(3/4):273–294, **1949.** 9 figs., 18 refs., 13 eqs. German, English and French summaries p. 273–275. **MH-BH**—Summarizes his own work and Rossby's work at Chicago. In about 40°N, at 5–15 km, is a band of very strong west winds (jet stream), maximum near tropopause, in or just south of a zone of maximum temperature gradient. In jet, tropopause drops steeply northward and is often double. Below jet is a frontal zone. The upper west wind develops quasistationary waves of length 50–120° which increase in amplitude to develop whirls, cold cyclonic to south, warm anticyclonic to north. Because of resonance these waves are most stable when length is integral part of earth's circumference. Observed structure agrees with constant flux of absolute moment of rotation (see fig. 7). (*Same item as* 4.54, April 1950, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Waves in the westerlies 3. Jet stream 4. Tropopause-wind relationships.**—*C.E.P.B.*

4G–20 551.557:629.13

Durst, C. S. and Davis, N. E., **Jet streams and their importance to air navigation.** *Institute of Navigation, London, Journal*, 2(3):210–218, July **1949.** 6 figs., 2 tables, 6 refs. **DWB**—Strong jet streams over N. Europe examined, discussed. No seasonal variation noted over Britain, where principal orientations of jets were NW–SE, SW–NE and S–N. Jets moved at about 10 knots at right angles to themselves. Effect of jet streams on computation of equivalent head winds discussed and occasions cited where they have seriously influenced navigation. *Subject Headings:* **1. Jet stream 2. Aerial navigation 3. Northern Europe.**—*G.J.E.*

4G–21 551.551:629.13

Hislop, G. S., **Clear air turbulence incident encountered by D-H "Comet" aircraft 14th November, 1949.** *British European Airways Corp., R.S.D. Note*, No. 41, Dec. **1949.** 4 p. fig. **DWB**—Brief summary of aeronautical and synoptic conditions accompanying a case of severe turbulence in clear air at 34 to 38,000 ft elevation above England and Scotland. Warm front was moving from west (Ireland) but no turbulence was found above the cloud banks or at 38–42,000 ft over Holland. It was thought that this and a few other cases of clear air turbulence were connected with the jet stream. Vertical gust velocities of +48 and −62 ft/sec (+2.0g and −2.6g) encountered. (*Same item as* 3K–133, Nov. 1952, *MAB.*) *Subject Headings:* **1. Clear air turbulence 2. High level turbulence 3. Jet stream 4. Jet transport flights 5. British Isles.**—*M.R.*

4G–22 551.513

Namias, Jerome and Clapp, Philip F., **Confluence theory of the high tropospheric jet stream.** *Journal of Meteorology*, 6(5):330–336, Oct. **1949.** 9 figs., 9 refs. **DWB**—Attempt to explain jet stream by theory that the energy is derived from a direct transformation of potential into kinetic energy and is independent of stability, and that the confluence or juxtaposition of cold and warm air currents creates the concentration isotherms and the potential energy field which results. Work of Palmén and others drawn upon to support theory; cross sections and normal charts of the Northern

Hemisphere circulation illustrate this brief but detailed article. (*Same item as* 2–78, Feb. 1950, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Jet stream theory 3. Confluence.**—*G.J.E.*

4G–23 551.515:551.557:551.558

Nyberg, A., **An aerological study of large-scale atmospheric disturbances.** *Tellus*, Stockholm, 1(1):44–53, Feb. **1949.** 11 figs., 16 refs. **DWB**—Author working in Chicago 1946–47 applied and tested forecasting techniques. Pressure change areas at 500 mb level found to move as a rule in direction of wind at 60% of its speed. Strong indications seen of dynamic interaction between distant flow patterns. Behavior of the jet stream and of the frontal surfaces in a deepening trough studied and a suitable synoptic situation investigated. Cold tropospheric air shown to sink as jet stream increases and front sharpens. Models given of distribution of vertical motion and divergence in frontal zones. *Subject Headings:* **1. Atmospheric disturbances 2. Jet stream 3. Vertical motion 4. Aerological Studies.**—*G.J.E.*

4G–24 551.515.127:551.557

Palmén, Erik, **On the origin and structure of high level cyclones south of the maximum westerlies.** *Tellus*, Stockholm, 1(1):22–31, Feb., **1949.** 13 figs., 8 refs. **DWB**—Description given of development of a cold "cut-off" vortex by a wave-like deformation in the upper flow increasing in amplitude until cold air to south of trough separates from that to north, where a belt of maximum westerlies is re-established. Mechanism thus shown of how a jet stream can break down and be re-established later at a more northerly latitude. *Subject Headings:* **1. Upper level cyclones 2. Jet stream theory.**—*G.J.E.*

4G–25 551.515.127:551.513.2:551.557

Palmén, Erik and Nagler, K. M., **The formation and structure of a large scale disturbance in the westerlies.** *Journal of Meteorology*, 6(4):227–242, Aug. **1949.** 24 figs., 22 refs. **DWB**—Four day period studied during which westerly flow was broken down and strong disturbances developed throughout all layers of atmosphere. The 500 and 200 mb surfaces and the vertical cross section studied. Zone of wind maximum in upper troposphere situated approximately vertically above intersection of 500 mb surface and upper boundary of frontal surfaces. Figures for maximum wind velocity in jet and for strong anticyclonic shear to right of it compare well with previous observations in strong zonal flow. *Subject Headings:* **1. Cyclogenesis 2. Synoptic aerological studies 3. Jet stream speed 4. Upper air winds.**—*G.J.E.*

4G–26 551.513.2:551.557

Prandtl, Ludwig, **Wettervorgänge in der oberen Troposphäre.** [Weather processes in the upper troposphere.] *Akademie der Wissenschaften in Göttingen, Math.-physik. Kl., Math.-physik.-chem. Abt., Nachrichten*, No. 2:13–18, **1949.** 4 figs., 4 refs. **DLC**—Author explains formation of jet stream by the lifting of cloud masses at a warm front. The jet stream appears polewards from the cloud belt. *Subject Headings:* **1. Jet stream theory 2. Upper troposphere.**—*A.A.*

4G–27 551.513.2:551.557

Rossby, C.-G., **On the nature of the general circulation of the lower atmosphere.** (In: Kuiper, G. P. (*ed.*), **The atmospheres of the earth and planets.** Chicago, University of Chicago Press, **1949.** p. 16–48. 22 figs., 27 refs.) **DWB**—Short historical review followed by notes on the more recent work of VUORELA, HESS, FULTZ, PALMEN, ROSSBY and others. Observational data produced in support of the author's theories on jet stream. (*Same item as* 10–65, Oct. 1950, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Jet stream theory.**—*G.J.E.*

4G–28 551.513.1

Sekera, Zdenek, **The distribution of kinetic energy in certain steady barotropic currents.** *Journal of Meteorology*, 6(5):321–329, Oct. **1949.** 3 figs., 5 refs., 24 eqs. **DWB**—Theoretical treatment of two cases of dispersion of kinetic energy in a zonal current, one the deflection of a zonal current, and the second, the splitting of a jet stream. Stream lines are computed for each case. (*Same item as* 2–79, Feb. 1950, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Double jet stream.**

4G–29 551.513:551.577:551.509(7)

Starrett, Loyd G., **The relation of precipitation patterns in North America to certain types of jet streams at the 300-millibar level.** *Journal of Meteorology*, 6(5):347–352, Oct. **1949.** 15 figs., 5 refs. **DWB**—The relation between high winds at the 300 mb level and 24 hour precipitation amounts studied for 57 cases in North America. Graphical evidence shows areas of heaviest precipitation lying within 4° or 5° of jet stream axis in 2 out of 3 cases, giving the forecaster a new tool.

(*Same item as* 2–80, Feb. 1950, *MAB.*) *Subject Headings:* **1. Jet stream effects 2. Precipitation distribution 3. Forecasting techniques 4. North America.**—*M.R.*

4G–30 551.513:551.557

§Wilkins, E. M., **Relation between speed and latitudinal position of the belt of strongest westerlies and the location of troughs and ridges aloft.** *Chicago. Univ. Dept. of Meteorology, Research Report,* Nov. **1949.** 7 p. 9 figs.—Studies effects of topography on westerly flow up to 700 mb. Effect on wave pattern seen by using statistical methods. Synoptic samples showing equal latitude and intensity of the maximum westerlies (jet streams) are grouped together for this purpose. Selection is made from the 5-day mean 700 mb charts prepared by the Extended Forecast Section of the U. S. Weather Bureau and the author shows similar positions of wave lengths and troughs at this level. *Subject Headings:* **1. Topographic effects 2. Jet stream 3. Atmospheric circulation 4. Waves in the westerlies 5. Synoptic studies.**—*G.J.E.*

1950

4G–31 551.513.2:551.515

§Berson, F. A., **On the role of long-wave instability in the general circulation; a study of five-day means in November 1948.** *Sweden. Meteorologiska och Hydrologiska Institut, Meddelanden, Ser. A,* No. 3, **1950.** 13 p. 15 figs. (incl. synoptic charts), 16 refs., eqs. **MH-BH**—Analyzing variations of zonal circulation at surface and 500 mb as well as large scale disturbances in westerlies during Nov. 1948 in light of Rossby's theory of formation of jet stream, author examines relationship between growth of planetary waves and formation of jet stream segments to south of the turbulent zone. Author has found a relation between shift of successive west wind maxima and growth of large scale turbulence in the circumpolar zonal current system. *Subject Headings:* **1. Clear air turbulence 2. Zonal circulation 3. Synoptic studies 4. Jet stream theory 5. Waves in the westerlies.**—*W.N.*

4G–32 551.513:551.557

Bilancini, Raoul, **La "corrente a getto."** [The jet stream.] *Rivista di Meteorologia Aeronautica,* 10(3):3–13, July/Sept. **1950.** 6 figs., 32 refs. Italian, French, English and German summaries p. 3. **MH-BH**—Beginning with information furnished by McTaggart-Cowan in his recent paper on the jet stream (*see item* 4G–46 below). Author reviews history of application of jet stream concept to zone of maximum westerlies in upper troposphere. Credit given to Willett, Rossby, Palmén, and many others. Charts of North America and Northern Hemisphere, showing position and nature of jet stream (taken from those prepared by Riehl, Namias and other Americans), reproduced. Application to forecasting. Several recent German papers on jet stream mentioned. (*Same item as* 2.9–75, Feb. 1951, *MAB.*) *Subject Headings:* **1. Jet stream 2. Progress in meteorology.**—*M.R.*

4G–33 551.515:551.513.2:551.557

Bleeker, Wouter, **The structure of weather systems.** Royal Meteorological Society, Centenary Proceedings, **1950.** p. 66–80. 9 figs., 19 refs. **DLC**—Author discusses various weather systems including moving "linear" weather systems. Synoptic evidence given of relation between fronts and jet streams. Mechanism for the displacement of the jet suggested. (*Same item as* 2.3–67, March 1951, *MAB.*) *Subject Headings:* **1. Atmospheric disturbances 2. Jet stream theory.**—*G.J.E.*

4G–34 551.513.2:551.557

Chaudhury, A. M., **On the vertical distribution of wind and temperature over Indo-Pakistan along the meridian 76°E in winter.** *Tellus,* 2(1):56–62, Feb. **1950.** 10 figs., 17 refs. **DWB**—Data from aerological stations in India and Siberia used to construct a mean meridional cross section (referred to long. 76°E) showing effect of Himalaya Range on mean solenoidal and wind fields in the upper atmosphere. Over Asia three jets are found; two north and one south of the Himalayas, in contrast to the one or two jets found in cross sections made with North American data. Computed anomaly of Asiatic circulation shown graphically. Vertical circulation patterns, wind shear, absolute vorticity, the isentropic field, stability field, solenoidal field with respect to the jet streams discussed and illustrated by means of schematic diagrams. Equatorial jet discussed in connection with the location of the winter rains in Southern India. (*Same item as* 6–38, June 1950, *MAB.*) (*See also item* 3–87, March 1950, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Jet stream profiles 3. Jet stream location 4. India 5. Siberia.**—*M.R.*

4G–35 551.513:551.557:629.13

Coyle, J. R., **The nature of sub-stratospheric conditions on the Buenos Aires–London air route.** Panair do Brasil, Meteorological Service, Brasilian Weather Study, **1950.** 10 p. 6 plates. Mimeo. **DWB**—General study of the so-called normal atmosphere for Jan. and July. Normal position of

Northern and Southern Hemisphere jet streams on the route depicted. Cores of high speed easterly winds seen in tropical regions. At 10 km, aircraft may encounter SW–NW winds in excess of 100 m.p.h. Easterly winds of 50 m.p.h. may be encountered between Recife and Sal Island. (*Same item as* 3C–32, March 1952, *MAB.*) *Subject Headings:* **1. Aeronautical climatology 2. Jet stream location.**—*G.J.E.*

4G–36 551.513.2:551.557

Cressman, G. P., **Variations in the structure of the upper westerlies.** *Journal of Meteorology*, 7(1):39–47, Feb. **1950.** 8 figs., 11 refs. **DWB**—Meridional cross sections for North America show jet streams appearing first in high latitudes then drifting slowly southwards and eventually disappearing. More than one jet stream seen on many occasions. Using circumpolar 500 mb charts the author extends his analysis to most of the Northern Hemisphere and draws continuous hemispheric jets. These exhibit same double character and southward progression. Splitting of a single jet into two distinct maxima occasionally observed. (*Same item as* 5–40, May 1950, *MAB.*) *Subject Headings:* **1. Jet stream structure 2. Atmospheric circulation 3. Meridional cross sections 4. Double jet stream.**—*G.J.E.*

4G–37 551.557:629.13

Davies, D. M., **Atmospheric winds.** *Royal Aeronautical Society, Journal*, 54(477):602–605, Sept. **1950.** 4 figs., ref. **DLC**—Simple technical exposition of geostrophic wind theory and its application to pressure pattern flying and to variation of wind with height, respectively. Effect of sloping tropopause, jet stream and thermal winds also discussed from the point of view of aerial navigation. (*Same item as* 2.1–122, Jan. 1951, *MAB.*) *Subject Headings:* **1. Upper air winds 2. Aeronautical meteorology 3. Jet stream.**—*M.R.*

4G–38 551.513:551.524.7:551.571.7:551.557

†*Flohn, Hermann, **Grundzüge der allgemeinen atmosphärischen Zirkulation auf der Südhalbkugel.** [Fundamentals of the general atmospheric circulation over the Southern Hemisphere.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 2(1):17–64, **1950.** 12 figs., 22 tables, 5 refs. **DWB**—Shows meridional cross sections for Southern Hemisphere including temperatures, humidities, and winds. (For fuller abstract *see item* 6–39, June 1950, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Meridional cross sections 3. Southern Hemisphere 4. Antarctica.** —*J. S. Winston.*

4G–39 551.513.2:551.557

Georgi, Johannes, **Hochstürme über der Dänemarkstrasse.** [High level storms over the Denmark Strait.] *Deutsche Hydrographische Zeitschrift*, 3(1/2):136–143, **1950.** 5 figs., 14 refs. English abstract, p. 137. **DLC**—Reports of northerly upper air gales between 5 and 15 km by the German research vessel "Meteor" over the Denmark Strait in 1926 now thought to have been evidence of jet stream. Problem of determining the "life history of fast air parcels and their relation to pressure distribution" raised. *Subject Headings:* **1. Jet stream 2. Upper air winds 3. Meteor Expedition, 1926 4. Denmark Strait.**—*M.P.K.*

4G–40 551.551:551.513.2:551.557

Harrison, H. T., **Some characteristics of the upper level LOW and the jet stream.** *United Airlines, Inc., Meteorology Circular*, No. 34, Jan. 3, **1950.** 21 p. 12 figs. **DWB**—Clear air turbulence at flight levels between 15,000 and 25,000 ft will often be found near the periphery of the cold LOW at 18,000 ft (500 mb) or in the vicinity of the jet stream. Cases of turbulence seemed closely related to sudden and decided horizontal changes in wind speed and temperature. (*Same item as* UK–151, Nov. 1952, *MAB.*) *Subject Headings:* **1. Clear air turbulence 2. Jet stream 3. Horizontal wind shear.**—*From author's abstract.*

4G–41 551.513.2:551.557

Hofmeyer, W. L., **Remarks on the theory of the jet stream.** *Journal of Meteorology*, 7(3):245, June **1950.** 3 eqs. **DWB**—Milanković, assuming a stationary atmosphere, anticipated from insolation distribution a sharp discontinuity between hot and cold air as a natural average condition that would occur at about 60° in each hemisphere. Hofmeyer shows that by taking motion into account, the zone of maximum temperature gradient would be nearer the equator and approximate to the latitude of the jet streams. *Subject Heading:* **1. Jet stream theory.**—*G.J.E.*

4G–42 551.513.2:551.557

Hsieh, Yi-ping, **The mean wind and temperature distribution through a flat upper ridge in winter.** *Tellus*, Stockholm, 2(2):130–133, May **1950.** 7 figs., 4 refs. **DWB**—Individually analyzed daily cross-sections through flat upper ridges used to construct a mean cross section, using position

of maximum of geostrophic zonal wind at upper levels as reference for the meridional coordinate. Temperature and wind fields, and vorticity discussed and results compared with those obtained by PALMÉN and NEWTON in their work concerned with distributions in vicinity of the polar front. (*Same item as* 11–71, Nov. 1950, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Jet stream.**—*G.J.E.*

4G–43 551.513

Hutchings, J. W., **A meridional atmospheric cross section for an oceanic region.** *Journal of Meteorology*, 7(2):94–100, April **1950.** 3 figs., 5 tables, 3 refs. **DWB**—Based on radiosonde data for 1943–1947 at a dozen stations in the Southwest Pacific, summer and winter means of upper-air temperature and wind (at standard heights to 20+ km) and heights of principal isobaric surfaces have been compiled and are presented in form of tables or mean cross sections along the 170th meridian E. Cross sections show the maximum west-wind field (jet stream) to be in the zone where the tropical tropopause (16 km) overlaps the polar tropopause (10–12 km). (*Same item as* 7–40, July 1950, *MAB.*) *Subject Headings:* **1. Upper air temperatures 2. Jet stream 3. Tropopause-wind relationships 4. Meridional cross sections 5. Southern Hemisphere 6. Southwest Pacific.**—*M.R.*

4G–44 551.513:551.465

Iselin, Columbus O'Donnell, **Some common characteristics of the Gulf Stream and the atmospheric jet stream.** *New York Academy of Sciences, Transactions, 2nd Ser.*, 13(2):84–86, Dec. **1950.** 5 refs. **DLC**—The author summarizes recent theoretical investigations on the course of the Gulf Stream and the results of the R. FLEMING expedition of June 6–22, 1950, which investigated in detail the path of the current and the characteristics of its motion. Similarities between the Gulf Stream and jet stream are pointed out as the result of the fact that both are general phenomena characteristic of the circulation within a thin envelope on a rotating sphere. (*Same item as* 3.4–115, April 1952, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Jet stream analogies 3. Gulf Stream.**—*I.L.D.*

4G–45 551.513.1:551.557

Kasahara, A., **On the dynamical mechanism of the high tropospheric jet stream.** *Tokyo University. Geophysical Institute, Geophysical Notes*, 3(31), **1950.** 10 p. 6 figs., 2 tables, 13 refs. 17 eqs., append. Also in: *Collected Meteorological Papers*, Tokyo, 2(2), Dec. **1950. MH-BH**—The present theory of upper west winds assumes conservation of total absolute vorticity in one hemisphere. Author calculates zonal wind distribution, reaching ROSSBY's solution in a different way. Assuming a discontinuity of vorticity in lat. 38°, he obtains good agreement between calculated and observed zonal profiles with a cusp of W winds about 90 m.p.h. in lat. 38° and E winds south of 22°. He then sets out theorem of conservation of absolute vorticity and deduces the existence of one or more jet streams and the northward shifting of the jet stream with the decrease of total momentum from winter to summer. *Subject Headings:* **1. Jet stream theory 2. Vorticity.**—*C.E.P.B.*

4G–46 551.513.2:551.557

*Loewe, F. and Radok, U., **A meridional aerological cross-section in the South-West Pacific.** *Journal of Meteorology*, 7(1):58–65, Feb. **1950.** 5 figs., 7 tables, 32 refs. **DWB**—Meridional cross-section drawn for region of longitude 150°E, using all recent aerological data. Average zonal geostrophic wind components are drawn for winter and summer. Winter zonal wind field shows a very pronounced jet stream centered at 12 km near 25°S with a minimum above 3 km near 50°S. The validity of the minimum is discussed. (*Same item as* 5–101, May 1950, *MAB.*) For further observational evidence indicating even larger velocities south of 40°S, *see ibid.*, 7(4):305–306, Aug. 1950. *Subject Headings:* **1. Upper air data 2. Jet stream location 3. Jet stream profiles 4. Southwest Pacific.**—*G.J.E.*

4G–47 551.513:551.557

†McTaggart-Cowan, P. D., **The jet stream.** *Royal Meteorological Society, Canadian Branch, [Publications]*, 1(1), Jan. **1950.** 37 leaves. 31 figs., 32 refs. Mimeo. **DWB**—A survey of the more important published works leading up to or dealing with the physics of the jet stream. The historical section begins with ROSSBY (1936); the "Fundamental papers" begin with ROSSBY (vorticity theory) and NAMIAS (confluence of cold and warm currents), both in 1947. Illustrated by numerous cross sections, surface and upper air charts, etc. Ends with a summary of the physical properties of the jet stream defined as a narrow zone of extremely strong winds in the upper troposphere. (*Same item as* 2.9–80, Sept. 1951, *MAB.*) *Subject Headings:* **1. Jet stream 2. Cross sections.**—*C.E.P.B.*

4G–48 551.513.1:551.557

Magata, M., **On the structure of the jet stream.** *Papers in Meteorology and Geophysics*, Tokyo, (2–4):175–187, Dec. 1950. 4 figs., tables, 3 refs., 42 eqs. **DWB**—From the simple equations of motion referred to rectangular coordinates, and the temperature and density fields, the equations of the wind field are derived. A model of the jet stream is calculated which reproduces the main observed features qualitatively, including an upward bulge in the tropopause south of the jet and a downward bulge to the north, but the calculated maximum velocity is only about 55 m/sec instead of 80. This excess velocity must be produced aud maintained by the general circulation. (*Same item as* 2.10–73, Oct, 1951, *MAB.*) *Subject Headings:* **1. Jet stream structure 2. Jet stream models 3. Atmospheric circulation.**—*C.E.P.B.*

4G–49 551.513.2:551.557:551.558

Nyberg, A., **A study of vertical motion and formation of fronts and jet streams.** Royal Meteorological Society, Centenary Proceedings, **1950.** p. 81–89. 7 figs., 6 refs. **MH-BH**—Selected synoptic situations are taken to discuss problems concerned with the formation of fronts and jet streams and of vertical motion concerned with them. A working rule is put forward that at the 500 mb and 500 mb level over England, warm advection gives ascending motion and cold advection descending motion. The local wind velocity and the velocity of air particles are seen to increase in the frontogenetic area. (*Same item as* 2.5–85, May 1951, *MAB.*) *Subject Headings:* **1. Frontogenesis 2. Jet stream theory 3. Vertical motion.**—*G.J.E.*

4G–50 551.513.2:551.557

Phillips, Norman A., **The behavior of jet streams over eastern North America during January and February, 1948.** *Tellus*, Stockholm, 2(2):116–124, May **1950.** 11 figs., 6 refs. **DWB**—Graph given of latitude of jets at 80°W as a function of time for a 49 day period. Discontinuous southward procession of successive jet streams seen as approximately 1/2° of latitude per day. At least two and sometimes three or four jet streams exist in the 20°-80° latitude belt. Several cases discussed. Suggested that CRESSMAN's southward progression of "hemispheric" jets is the statistical result of the southward movement of successive jet streams occurring at several longitudes simultaneously. (*Same item as* 11–62, Nov. 1950, *MAB.*) *Subject Headings:* **1. Jet stream structure 2. Jet stream location 3. Synoptic aerological studies 4. North America.**—*G.J.E.*

4G–51 551.513

Priestley, C. H. B., **On the dynamics of the general atmospheric circulation.** *Australian Journal of Scientific Research, Ser. A, Physical Sciences*, 3(1):1–18, **1950.** fig., 5 tables, 19 refs., 2 eqs. Abstracted from reprint. **MH-BH**—Important paper developing the theory of zonal circulation and the jet stream to explain the evident poleward drift across isobars at high levels and partial counterdrift at low levels). Such drifts seem to occur in the latitudes just outside the tropics, where the jet stream is the most pronounced (when it occurs) and are associated with strong vertical wind shear on equatorial side of jet. Poleward drift evaluated in terms of fluctuations in zonal index and strength and latitude of the jet stream. Finally, ROSSBY's (1947) theory of planetary circulation based on mixing length concepts is applied quantitatively, using WILLETT's (1948) data. (*Same item as* 2.1–75, Jan. 1951, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Dynamics of the atmosphere 3. Jet stream theory 4. Momentum of transfer.**—*M.R.*

4G–52 551.513:551.557

Riehl, H.; Yeh, Tu-cheng and La Seur, N. E., **A study of variations of the general circulation.** *Journal of Meteorology*, 7(3):181–194, June **1950.** 21 figs., 2 tables, 13 refs. **DWB**—Quantitative analysis made of changes in upper circulation between 10°N and 70°N over a period of 28 months. Seasonal trend of zonal wind showed certain marked differences from year to year. Jet stream was constant feature but in 1945 and 1947 it attained its highest latitude (50°N) during mid-Sept. at the height of the hurricane season. In the winter of 1947–48 it reached its lowest latitude early in Dec. In the winter 1948–49 its lowest position was not reached until late in March, 1949. Latitudinal distribution of deviations of momentum of the westerlies show definite long term trends. (*Same item as* 8–39, Aug. 1950, *MAB.*) *Subject Headings:* **1. Jet stream variations 2. Jet stream location 3. Atmospheric circulation.**—*G.J.E.*

4G–53 551.513

Rossby, C.-G., **On the dynamics of certain types of blocking waves.** *Chinese Geophysical Society, Nanking, Journal*, 2(1):1–13, June **1950.** 3 refs., eqs. In English. **DWB**—The sudden breakdown of well defined, zonal, west wind currents or jets in middle latitudes after a fairly long period of stability occurs in the form of a "blocking wave" which progresses slowly westward, destroying the zonal motion to the west and leaving in its wake a series of cyclonic and anticyclonic vortices. It is

shown theoretically that this process is analogous to a moving hydraulic jump or bore. The author considers the non-divergent horizontal motion of a west wind jet in an incompressible atmosphere and attempts to show that "for a constant volume transport the momentum transfer across a vertical plane normal to such a jet, if expressed as a function of some characteristic velocity, possesses a minimum value." Since the two solutions, compatible with the continuity and momentum requirements, represent two different energy levels a necessary requirement for the development of jumps is fulfilled. (*Same item as* 2.5-69, May 1951, *MAB.*) *Subject Headings:* **1. Blocking action 2. Dynamics of the atmosphere 3. Jet stream structure.**—*I.L.D.*

4G–54 **551.557:551.501.7**

Sawyer, J. S., **The movement of jet streams and the wind hodograph.** *Meteorological Magazine*, London, 79(942):357–358, Dec. **1950.** fig. **MH-BH**—The straight section of the hodograph is prolonged. A perpendicular from this to the origin represents the direction of motion of the jet axis and, roughly, its speed. Author concludes that the movement of a jet stream perpendicular to its axis is closely related to the component in this direction of the wind within the jet. (*Same item as* 2.6–87, June 1951, *MAB.*) *Subject Headings:* **1. Jet stream 2. Upper air winds 3. Hodographs.**—*C.E.P.B.*

4G–55 **551.513.2:551.557**

Starr, Victor P., **Geostrophic departures in the Jet-Stream.** *Tellus*, Stockholm, 2(3):233–235, Aug. **1950.** eqs., 3 refs. **DWB**—In this purely theoretical note, author takes one particular integrated model of flow and studies effect of gradients in the cross-current eddy motions on the geostrophic balance. Its application to jet streams and ocean currents and their geostrophic departures are briefly discussed. (*Same item as* 2.2–65, Feb. 1951, *MAB.*) *Subject Headings:* **1. Jet stream models 2. Geostrophic winds.**—*G.J.E.*

4G–56 **551.513.2:551.557**

Van Mieghem, Jacques, **Sur la circulation transversale associée à un courant atmosphérique.** [On transverse circulation associated with an atmospheric current.] *Tellus*, 2(1):52–55, Feb. **1950.** 5 refs., eqs. **DLC**—Author criticizes the interpretation of V. BJERKNES' circulation theorem. Cross-jet circulation shown to depend on five terms. No attempt made to evaluate them, but it is considered that the two terms, concerned with: 1) difference between thermal wind and actual vertical wind change, and 2) a term involving horizontal wind shear, play the major roles. (*Same item as* 6–37, June 1950, *MAB.*) *Subject Headings:* **1. Jet stream theory 2. Atmospheric circulation.**—*G.J.E.*

4G–57 **551.513.1:551.511:551.557**

Yeh, Tu-cheng, **The circulation of the high troposphere over China in the winter of 1945–46.** *Tellus*, 2(3):173–183, Aug. **1950.** 13 figs., table, 14 refs. **DWB**—By means of atmospheric cross sections based on rawinsondes made in China, Japan and adjacent areas, author has made an intensive study of relation between position of jet stream over Far East and attendant rainfall, movements of troughs and circulation above and below the jets. Formation and movement of these jets in autumn, and zonal wind distribution in winter (1945–6) specially treated. Comparison made between conditions in East Asia and eastern America. (*Same item as* 2.2–69, Feb. 1951, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Jet stream 3. Structure of the troposphere 4. Dynamics of the atmosphere 5. China.**—*M.R.*

1951

4G–58 **551.513.1:551.511**

Arakawa, Hidetoshi, **Tropopause in a steady zonal wind field.** *Meteorological Society of Japan, Journal, 2nd Ser.*, 29(3):86–89, March **1951.** 2 refs., 6 eqs. In English, English and Japanese summaries 86–87, 89. **MH-BH**—The equations of a steady zonal wind are solved, giving continuous nearly straight isobars with a slope at the tropopause steeper than those of neighboring isobaric surfaces in temperate latitudes. Above this, the meridional temperature gradient changes direction. Jet streams are most probable near the tropopause in the westerlies; north of this the tropopause dips. (*Same item as* 3.3–112, March 1952, *MAB.*) *Subject Headings:* **1. Jet stream 2. Tropopause-wind relationships.**—*C.E.P.B.*

4G–59 **551.513**

Aubert, Eugene J. and Winston, Jay S., **A study of atmospheric heat-sources in the Northern Hemisphere for monthly periods.** *Journal of Meteorology*, 8(2):111–125, April **1951.** 15 figs., 17 refs., 7 eqs. **MH-BH**—Shows relation of monthly 700 mb "jet" to heating and cooling effects. (For fuller abstract *see item* 2.11–69, Nov. 1951, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Energy exchange 3. Jet stream 4. Northern Hemisphere.**—*J. S. Winston.*

4G–60 551.551:551.557

Bannon, J. K., **Meteorological aspects of turbulence affecting aircraft at high altitude.** *Great Britain. Meteorological Office, Professional Notes*, No. 104, 1951. 16 p. 15 tables, 11 refs. **DWB**—Results presented of analysis of turbulence (bumps) encountered by aircraft flying between 20,000 and 40,000 ft. Noticeable turbulence found to be relatively common and most frequent at about 30,000 ft. It is rarely severe, greatest acceleration measured being 0.7 g. Turbulence seen to be related to Richardson number. Well marked jet streams and their margins found to be areas in which turbulence frequently occurred. (*Same item as* 3K-162, Nov. 1952, *MAB.*) *Subject Headings:* **1. High level turbulence 2. Jet stream turbulence 3. Aeronautical meteorology.**—*G.J.E.*

4G–61 551.551

Bannon, J. K., **Severe clear air turbulence experienced at high altitude on 2nd and 7th November, 1950.** *Great Britain. Meteorological Research Committee, M.R.P.*, 631, Feb. 1, 1951. 8 p. figs., 4 tables, 6 refs. **DWB**—Meteorological conditions associated with severe clear air turbulence at about 35,000 ft discussed in some detail. Turbulence occurred in region of sharply marked jet streams and was associated with strong vertical wind shear and small Richardson numbers. (*Same item as* 3K–145, Nov. 1952, *MAB.*) *Subject Headings:* **1. Clear air turbulence 2. Jet stream turbulence 3. High level turbulence 4. Bumpiness.**—*M.P.K.*

4G–62 551.557:551.513:629.13

Blair, Charles F., Jr., **Flying the jet stream.** *Skyways*, New York, 10(9):12–13, 46–47, Sept. 1951. 4 photos. **DWB, DLC**—Experiences of the author in a flight from New York to London on Jan. 31, 1951 with special effort made to follow the jet stream. Tail winds as high as 230 m.p.h. found at 35,000 ft in the vicinity of weather ship "Charlie," giving the pilot a ground speed of 600 m.p.h. At high altitudes the jet stream may be avoided by flying the northern route (via Iceland) on the return trip from England. (*Same item as* 4.4–175, April 1953, *MAB.*) *Subject Headings:* **1. Aeronautical meteorology 2. Jet stream speed 3. High altitude flying.**—*M.R.*

4G–63 551.557:551.513:551.558.29

Clapp, Philip F. and Winston, Jay S., **A case study of confluence as related to the jet stream.** *Journal of Meteorology*, 8(4):231–243, Aug. 1951. 17 figs., table, 14 refs., eqs. **DWB**—A continuation of the work reported by NAMIAS and CLAPP (*see* 4G–22 above) on the synoptic and physical factors leading to the development and maintenance of confluence in a given region. This paper attempts to define more exactly the conditions in the vicinity of a jet stream and is based on analysis of a series of 5-day mean charts for the 10,000 ft level (May 1944). Geostrophic wind speed and temperature advection profiles show that local changes in wind speed result from advection of cold or warm air on either side of the jet stream, and that there is descending motion north and ascending motion south of the jet stream at 10,000 ft. (*Same item as* 3.5–224, May 1952, *MAB.*) *Subject Headings:* **1. Confluence 2. Jet stream theory 3. Vertical motion.**—*M.R.*

4G–64 551.513.2:551.557

Davis, N. E., **The mean position of the jet stream.** *Great Britain. Meteorological Research Committee, M.R.P.*, 615, Jan. 1951. 2 p. Mimeo. **GB-MO**—Demonstrated that due to its peculiar wind structure the mean position of the jet stream is likely to be found close to its extreme low latitude position. *Subject Heading:* **1. Jet stream location.**—*G.J.E.*

4G–65 551.513:551.557

Defant, Friedrich, **Die Änderungen des meridionalen Windprofils durch Kondensationswärme und Turbulenzvorgänge.** [The changes of the meridional wind profile by heat of condensation and by turbulence processes.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 4:156–175, 1951. 8 figs., table, 6 refs., 5 eqs. German summary p. 173–174, English and French p. 156. **DWB**—The wind profile depends on a number of variables involving pressure, temperature, and heat. Author examines the effect of changing individual factors: 1) vertical exchange coefficient; 2) mean rainfall over the earth as a whole (affecting decrease of temperature with height); 3) horizontal meridional exchange coefficient and 4) meridional distribution of precipitation. He calculates resulting meridional temperature and wind profiles. The effects on the development of the jet stream are discussed; the heat of condensation resulting from zonal distribution of precipitation appears to be the dominant factor. (*Same item as* 3.3–106, Mar. 1952, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Thermodynamics of the atmosphere 3. Jet stream theory 4. Wind profiles 5. Atmospheric turbulence.**—*C.E.P.B.*

4G–66 551.513:551.515:551.509.3

†Eady, E. T. and Sawyer, J. S., **Dynamics of flow patterns in extra-tropical regions.** *Royal Meteorological Society, Quarterly Journal*, 77(334):531–551, Oct. 1951. 53 refs., 14 eqs. **MH-BH—**

"The aim of this article is to elucidate some of the basic concepts and lines of thought in modern research." It opens with a description of the jet stream and blocking action in upper troposphere. Authors then discuss equations of motion of a frictionless fluid, the barotropic theory of long waves, and the development of cyclones and anticyclones by relative divergence, with special reference to the work of SUTCLIFFE. Discussions of the stability of atmospheric motion and dynamical instability lead to a study of baroclinic disturbances (CHARNEY and EADY). The possibility of computing the weather forecast is discussed not unhopefully. Brief references are made to experiments in dynamical meteorology and to small scale topographic effects. (*Same item as* 3.4–114, April 1952, *MAB.*) *Subject Headings:* **1. Dynamic meteorology 2. Waves in the westerlies 3. Jet stream.**—*C.E.P.B.*

4G–67 551.513.1:629.13

Gray, George J., Jr., **Jet streams and aircraft operations.** *Weatherwise*, 4(5):99–101, 114, Oct. **1951.** 2 figs. **MH-BH**—A nontechnical description of the characteristics of the jet streams: their location, speed, life cycle pattern and relation to local circulation. A diagram showing a simplified version of a jet stream associated with a frontal system is given and analyzed. (*Same item as* 3.4–118, April 1952, *MAB.*) *Subject Headings:* **1. Jet stream 2. Aeronautical meteorology 3. Upper air winds.**—*I.L.D.*

4G–68 551.501.7:551.513.2:551.557

James, R. W., **A February cross-section along the Greenwich meridian.** *Meteorological Magazine*, London, 80(954):341–346, Dec. **1951.** 3 figs., table, 6 refs., 3 eqs. **MH-BH**—Author constructed meridional profiles of geostrophic W wind component at pressure levels 850–200 mb based on 1.06 $(\Delta Z/\Delta \cos \phi)$ m/sec, Z = contour height of pressure level. Profiles for 850 and 300 mb shown, also isopleths of mean zonal wind velocity showing a mean jet in 40°N, 300–200 mb. Results compared with N. America and China. (*Same item as* 3.6–84, June 1952, *MAB.*) *Subject Headings:* **1. Zonal circulation 2. Wind profiles 3. Jet stream.**—*C.E.P.B.*

4G–69 551.513:551.557

Jet winds rule the weather. *Science Digest*, 29(5):65–66, May **1951.** **DWB**—Description of jet stream which is called a "Gulf Stream" five miles above the ground. (*Same item as* 2.9–77, Sept. 1951, *MAB.*) *Subject Heading:* **1. Jet stream.**

4G–70 551.513.2:551.515.8:551.524.7

Jones, J. J., **The physical cause of the jet stream in the Japanese area.** *U. S. Air Force, 2143 D Air Weather Wing Technical Bulletin*, 1(7):4–21, June **1951.** 15 figs., 6 eqs. **DWB**—Lucid, qualitative attempt to explain jet stream as effect of temperature distribution brought about by the development of a cyclone on a frontal surface separating two air masses. Author's conclusion based on study of mean temperature distribution both horizontally and in a meridional plane in the western Pacific and upon the relationship between temperature distribution and wind field. (*Same item as* 3.6–85, June 1952, *MAB.*) *Subject Headings:* **1. Jet stream theory 2. Atmospheric circulation 3. Upper air temperatures 4. Western Pacific 5. Japan.**—*I.L.D.*

4G–71 551.513:551.589

Murakami, T., **On the study of the change of the upper westerlies in the last stage of Bai-u Season (Rainy season in Japan).** *Meteorological Society of Japan, Journal, 2nd Ser.*, 29(5):162–175, **May 1951.** 15 figs., 3 tables. In Japanese, English summary p. 175. **MH-BH**—A study illustrated by time sections of 700 mb level, vertical sections and isohypses for 300, 500, and 700 mb of the jet streams over Japan in June 25–July 25, 1950. During the Bai-u the jet stream is double in 140°E, branches in 35° and 60°N. At the end of the Bai-u, about mid-July, a "cut off low" appears over Japan and the southern branch of the jet stream ceases abruptly (*see* fig. 5). (*Same item as* 3.3–109, March 1952, *MAB.*) *Subject Headings:* **1. Jet stream structure 2. Double jet stream 3. Bai-u 4. Japan.**—*C.E.P.B.*

4G–72 551.513.2:551.557

Murray, R. and Daniels, Sylvia, **Transverse flow at entrance and exit to jet streams.** *Great Britain. Meteorological Research Committee*, M.R.P., 690, Nov. 19, **1951.** 6 p. 4 figs., 2 tables, 5 refs. Mimeo. **DAWS**—The wind components across the jet axis were found from 200 mb below to 100 mb above maximum wind levels in 1948–50. A component of 8 knot from right to left (looking downstream) was found at the entrance, 6 knot from left to right in center, and 12 knot from left to right at exit. Mean pressure levels were 279 mb at entrance and 306 mb at exit. The probable circulations are shown schematically. (*Same item as* 3.11–116, Nov. 1952, *MAB.*) *Subject Heading:* **1. Jet stream profiles.**—*C.E.P.B.*

4G–73 551.557:551.513:656.7

Namias, Jerome, **Meteorology in navigation.** *Institute of Navigation, Los Angeles, 7th Annual Meeting, New York City, 1951, The Sciences in Navigation,* p. 62–74 [n.d.] charts, diagrs., refs. **DWB**—Elements of upper air circulation discussed in general terms with explanatory charts. Regular properties and seasonal and irregular variations of jet streams explained. Direct and indirect effect of circulation in the vicinity of the tropopause on aviation is mentioned. (*Same item as* 3.10–198, Oct. 1952, *MAB.*) *Subject Headings:* **1. Aeronautical meteorology 2. Upper air circulation 3. Jet stream.**—*G.T.*

4G–74 551.515.1:551.557:551.513

§Newton, C. W., Phillips, N. A., Carson, J. E. and Bradbury, D. L., **Structure of shear lines near the tropopause in summer.** *Tellus,* 3(3):153–171, Aug. **1951.** 20 figs., 16 refs., 2 eqs. **MH-BH**—"In this detailed study of shear lines near the tropopause in summer, two cases in which frontal activity was weak and limited to the lowest layers, were investigated in order to minimize the role of a subsiding air mass in producing a vertical stretching and consequent concentration of vorticity in the higher atmosphere." A synoptic description of the period of July 6–10, 1950 based upon 200 mb charts is presented. Circulation over North America characterized by presence of two jet streams. It is suggested that the strong northerly flow culminated in shear line formation "which depends upon a mutual interaction between the mass and velocity fields of jet-stream vortices located at different latitudes." Evidence is presented that vorticity may be generated in the free atmosphere. (*Same item as* 3.11–120, Nov. 1952, *MAB.*) *Subject Headings:* **1. Shear lines 2. Jet stream 3. Atmospheric circulation 4. Tropopause 5. Synoptic studies.**—*I.L.D.*

4G–75 551.513:551.515

Palmén, E., **The rôle of atmospheric disturbances in the general circulation.** *Royal Meteorological Society, Quarterly Journal,* 77(333): 337–354, July **1951.** 11 figs., 2 tables, 27 refs., 15 eqs. **DWB**—Symons Memorial lecture presenting some of the research done at University of Chicago since 1946. With momentum flux primarily determined by the drift term, it is seen that strongest west wind in upper troposphere must be observed almost vertically above the subtropical high-pressure belt, in agreement with results shown by mean meridional cross sections drawn by various workers for both hemispheres. Author points out that jets so computed from mean cross-sections are not identical with the "meandering" jet associated with polar front disturbances. (*Same item as* 2.10–71, Oct. 1951, *MAB.*) *Subject Headings:* **1. Jet stream 2. Atmospheric circulation 3. Atmospheric disturbances 4. Meridional cross sections.**—*G.J.E.*

4G–76 551.513.2:551.557

• Porter, E. M., **Some observations of a "jet stream" in the New Zealand region.** *New Zealand. Meteorological Service, Circular Note,* No. 74, Wellington **1951.** 2 p. 12 figs., 5 refs. **DWB**—Paper presented at the Royal Society of New Zealand, 7th Scientific Congress, Christchurch, May 1951. Winds were determined from radar observations and supplemented by geostrophic winds deduced from radio-sonde ascents. Vertical cross sections drawn along a line joining stations near 170°E longitude (from Taieri to Guadalcanal) for a ten-day period show the persistence of jet stream. Its characteristics similar to jet streams found in Northern Hemisphere. *Subject Headings:* **1. Jet stream profiles 2. New Zealand.**—*G.J.E.*

4G–77 551.557:551.465

Rossby, C.-G., **On the vertical and horizontal concentration of momentum in air and ocean currents. 1. Introductory comments and basic principles with particular reference to the vertical concentration of momentum in ocean currents.** *Tellus,* Stockholm, 3(1):15–27, Feb. **1951.** fig., 11 refs., 91 eqs. **DWB**—Attempt to show theoretically a mechanism through which momentum of certain stratified air and ocean currents may be concentrated vertically in a shallow layer or jet. A straight, parallel, heterogeneous and incompressible current with a free surface, hydrostatic pressure distribution and a continuous density field is analyzed. Emphasis almost entirely on ocean currents. Author notes that such evidence as is now available indicates strong individual atmospheric jets are limited both in length and life span. (*Same item as* 2.11–63, Nov. 1951, *MAB.*) *Subject Headings:* **1. Jet stream analogies 2. Ocean currents.**—*G.J.E.*

4G–78 551.513.1:551.557

Rossby, C.-G., **Über die Vertikalverteilung von Windgeschwindigkeit und Schwerestabilität in Freistrahlbewegungen der oberen Troposphäre.** [On the vertical distribution of wind velocity and gravitational stability in free striated motion of the upper troposphere.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A,* **4:3–23, 1951.** 6 figs., 6 refs., 80 eqs. German, English and French summaries p. 3–4. **DWB**—Wind distribution at 200–300 mb over N. America often

shows, especially in summer, parallel shallow streaks of high velocity (local jet streams, sometimes over 100 knots) separated by much lighter winds and with feeble winds above 150 mb and below 400–500 mb. They are of limited length and probably transient. Several examples shown by charts and vertical sections. This distribution is tentatively related to the condition of minimum transport of momentum across a vertical section through the current. A basic relation between the vertical gradients of wind velocity and potential temperature, satisfying this condition, is derived (eq. 65). "Stratified currents approaching this limiting state normally pick up speed in the center and shrink in depth." (*Same item as* 3.4–120, April 1952, *MAB.*) *Subject Headings:* **1. Jet stream 2. Troposphere.**—*C.E.P.B.*

4G–79 551.513.2:551.557

Sato, T., **Dynamics of the jet stream.** *Papers in Meteorology and Geophysics*, Tokyo, 2(2):132–149, June **1951.** 4 figs., 15 refs. **DWB**—Using spherical coordinates and assuming a frictionless, autobarotropic fluid, author derives from equation of motion, equations expressing along a stream line the law of conservation of angular momentum, the law of conservation of vorticity and the law of conservation of energy. He then goes on to show features of the surface of discontinuity, and the cellular structure of the meridional circulation of the troposphere. Jet stream shown to develop in northern part of each cell. Figure illustrates theoretical properties derived and its characteristics are shown to agree with those noted by earlier investigators. (*Same item as* 4.2–108, Feb. 1953, *MAB.*) *Subject Headings:* **1. Jet stream dynamics 2. Atmospheric circulation.**—*G.J.E.*

4G–80 551.510.52/3:551.557

Sawyer, J. S., **Day to day variations in the tropopause. Their causes and significance.** *Great Britain. Meteorological Research Committee, M.R.P.*, 612, Feb. **1951.** 20 p. 33 figs., 2 tables, 46 refs. **GB-MO**—Author reviews earlier work and refers to close association between folded tropopause and jet stream, and its possible production by cross-jet circulations in a region of confluence. *Subject Headings:* **1. Tropopause 2. Jet stream.**—*G.J.E.*

4G–81 551.557:551.576.11

Sawyer, J. S. and Ilett, B., **The distribution of medium and high cloud near the jet stream.** *Meteorological Magazine*, London, 80(952):277–281, Oct. **1951.** fig., 4 tables. **DWB**—Large number of jet streams examined and cloud observations tabulated in relation to their position with regard to the jet. Cirrus clouds found to be much more frequent and extensive to right of jet axis, although anvil cirrus was more common to left. Individual cases suggest that when there is a well defined boundary to frontal cirrus, the jet's axis is found close to this boundary. (*Same item as* 3.4–195, April 1952, *MAB.*) *Subject Headings:* **1. Cloud observations 2. Jet stream cloud formations.**—*G.J.E.*

4G–82 551.513.2:551.557(52)

Serebreny, S. M. (*Pan Amer. World Airways*), **Some preliminary considerations of the jet stream over Japan.** *Pan American World Airways, Inc., Pacific Alaska Div., Technical Report*, No. 41, July **1951.** 29 p. 15 figs., table, 8 refs. **DWB**—Theoretical considerations about the general circulation show that strong jet streams must be developed on the east coasts of continents. A private company started an investigation of the jet stream over Japan where it is found to be far more intense than anywhere else. For example, a wind velocity of 400 knots at 35,000′ height is found. The steadiness of winds above 10,000′ is extremely high (90–99%). The occurrence of winds (over 75 knots) is too frequent for economical operation of airplanes in east–west direction above 18,000 ft. Numerous cross sections for single days of wind velocity, actual and potential temperature are added, showing multiple jets. (*Same item as* 4.3–120, March 1953, *MAB.*) *Subject Headings:* **1. Jet stream 2. Cross sections 3. Japan.**—*A.A.*

4G–83 551.557

Sheppard, P. A., **The jet stream and related phenomena.** *Science Progress*, 39(155):483–495, July **1951.** 4 figs., 13 refs. **DWB**—Jet stream defined as a core of fast-moving air in slower air to north and south, above and below. Wind speed may reach 150 m/sec. Cross section shown from N. Norway to Spain. Shape and geographical distribution described—forming in 70°N, moving S and dying out in 35–20°N. Origin not known, but it is related to temperature and wind shear; the critical anticyclonic shear is 10 m/sec per 100 km. It overlies the polar front and is associated with clear air turbulence. Finally, some suggestions by Rossby as to dynamic cause are discussed. (*Same item as* 3.1–124, Jan. 1952, *MAB.*) *Subject Headings:* **1. Jet stream theory 2. Upper air winds 3. Progress in meteorology 4. Meridional index.**—*C.E.P.B.*

4G–84 551.513.2:551.557

Williamson, E. A., **High level "jet streams" in the atmosphere.** *New Zealand. Meteorological Service, Circular Note*, No. 72, **1951.** 7 p. 5 figs., 7 refs. **DWB**—Paper presented at Royal Society of New Zealand 7th Science Congress, Christchurch, May 1951. A non-theoretical survey of knowledge so far gained on jet streams. Their location, movements, influence on fronts and the temperature fields associated with jets are briefly discussed. Figures include a jet stream development over N. America by confluence and another to show that horizontal mixing could produce distributions of the zonal winds at 12 km similar to observed winds. *Subject Headings:* **1. Jet stream 2. Meridional circulation.**—*G.J.E.*

4G–85 551.557(52)

Yamada, H. and Matsuhashi, S., **On the winds aloft analysis of RAOB.** *Tateno, Japan. Aerological Observatory, Journal*, 5(1):20–31, March, **1951.** In Japanese, English summary p. 20. —Aerological data obtained during Nov. 1949 to Oct. 1950 in Japan used to investigate annual variations of surface with maximum wind velocities (about 200 mb) and surface at which the wind velocity becomes zero (40–70 mb). Jet stream is investigated by vertical cross sections of mean wind velocities. *Subject Headings:* **1. Upper air winds 2. Jet stream profiles 3. Japan.**—*G.J.E.*

4G–86 551.513.1:551.557.2

Yeh, Tu-cheng, **On the maintenance of zonal circulation in the atmosphere.** *Journal of Meteorology*, 8(3):146–150, June **1951.** 3 tables, 13 refs., 7 eqs. **DWB**—The existence of a jet stream around the earth requires vorticity transport from regions of anticyclonic vorticity found in low latitudes to regions of cyclonic vorticity in high latitudes. Equations, representing the transfer of vorticity, are presented. In low latitudes meridional and large horizontal vortical systems are equally effective in transporting vorticity from low to high latitudes; in middle latitudes the large horizontal vortical systems are more efficient; in high latitudes the role of the mean circulation in maintaining the zonal circulation is negligible. These conclusions are based upon numerical examples. (*Same item as* 3.3–113, March 1952, *MAB.*) *Subject Headings:* **1. Zonal circulation 2. Jet stream 3. Vorticity equations.**—*I.L.D.*

4G–87 551.577.21:551.513(266)

Yeh, Tu-cheng; Carson, James E. and Marciano, Joseph J., **On the relation between the circumpolar westerly current and rainfall over the Hawaiian Islands.** *Meteorological Monographs*, Boston, 1(3):47–55, June **1951.** 13 figs., 8 refs. **MH-BH**—The frequency distribution of the position, maximum shear, and velocity of the jet stream over the western Pacific at 700 mb are studied. These factors are correlated with the Hawaiian rainfall. The rainfall increases with the latitude of the jet. It also increases with the amount of the anticyclonic shear south of the westerlies and decreases as the speed of the jet increases. (*Same item as* 3.10–231, Oct. 1952, *MAB.*) *Subject Headings:* **1. Jet stream effects 2. Rainfall 3. Pacific Ocean 4. Hawaiian Islands.**—*Authors' abstract.*

4G–88 551.557

*Anderson, Albert D., **Meteorological trajectory study for test flights to be made from San Francisco.** *U. S. Naval Research Laboratory, NRL Memorandum Report*, No. 23, May 21, **1952.** 11 p. 27 figs., 4 tables, 7 refs. **DWB**—An interim report on a trajectory study made to determine the probable flight path and speed of constant level balloons released from San Francisco in winter at 300 mb (30,000 ft) including charts of trajectories and frequency distributions showing average speed in knots and time in hours for 99–119 balloons over distances of 2000–3000 mi across the U. S. Average speed 64 knots (75% in 40–75 knot interval) and 70% of trajectories lie entirely within the U. S. Forecasting future trajectories seems possible. Jet stream discussed and shown diagrammatically. *Subject Headings:* **1. Constant level balloons 2. Upper air winds 3. Jet stream speed 4. United States.**—*M.P.K.*

4G–89 551.513:551.515.7

Arakawa, H., **The anticyclonic eddies just south of jet stream.** *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 5(1):1–4, **1952.** 2 figs., eqs., 11 refs. **DLC**—The equations of motion in an anticyclone are satisfied in a zone of large shear with anticyclonic vorticity. Usually found just south of the jet stream. (*Same item as* 3.11–113, Nov. 1952, *MAB.*) *Subject Headings:* **1. Jet stream 2. Anticyclones.**—*C.E.P.B.*

4G–90 551.557:551.510.52/3

Austin, E. E. and Bannon, John K., **Relation of the height of the maximum wind to the level of the tropopause on occasions of strong wind.** *Meteorological Magazine*, London, 81(965):321–325, Nov. **1952.** 2 figs., table, 3 refs. **MH-BH**—For Larkhill and Lerwick 1948–50 frequencies are

given of pressure at (a) level of maximum wind ≥ 70 knot; (b) at tropopause; (c) a–b. Means of (a) and (b) and correlation r between them are: Larkhill 268,226 mb, r 0.43; Lerwick, 278, 244 mb, r 0.18. Results are discussed in relation to structure of jet streams. At Lerwick maximum wind often occurs well above tropopause. (*Same item as* 4.4–174, April 1953, *MAB.*) *Subject Headings:* **1. Upper air winds 2. Jet stream structure.**—*C.E.P.B.*

4G–91 551.513.2:551.557:551.509.3

§Crocker, A. M., **Jet stream in eastern North America on the afternoon of May 20, 1952.** *Canada. Meteorological Div., Cir.*, 2153, Tec. 119, Aug. 22, **1952.** 4 p. fig., 3 refs. **DWB**—Discusses forecasting and identification of jet stream, using 500 mb and 200 mb maps in cases when no wind reports are available. *Subject Headings:* **1. Jet stream forecasting 2. North America.**—*A.A.*

4G–92 551.513.2:551.557(676)

Davies, D. A. and Sansom, H. W., **Easterly jets over East Africa.** *Weather*, 7(11):343–344, Nov. **1952.** 2 tables. **DWB**—Detailed examination made of morning radar wind observations at Nairobi between Jan. 1948 and Nov. 1951. On six occasions winds exceeding 45 knots persisted for several days between the 40,000 and 47,000 ft levels. Maximum speed 77 knots. Wind direction in all cases was between 80° and 110°. One table gives daily values of jet occurring in July 1951 for pressure levels of 300 mb to 130 mb; second gives maximum velocities for the six occasions noted. Jet streams were not in evidence below 40,000 ft, and seemed only to occur Dec.–Feb., and July–Dec. and always from the east. (*Same item as* 4.4–174, April 1953, *MAB.*) *Subject Headings:* **1. Jet stream 2. Easterly jet stream 3. Jet stream speed 4. Equatorial meteorology 5. East Africa.**—*G.J.E.*

4G–93 551.511 551.513.2:551.557

Flohn, Hermann, **Behrmanns "Prinzip der Selbstverstärkung" in der Meteorologie und die Mäanderbildung in Atmosphäre und Ozean.** [Behrmann's "Principle of self-generation" in meteorology and the development of meanders in the atmosphere and ocean.] *Erde*, Berlin, (3/4):211–219, **1951/1952.** 23 refs. German and English summaries p. 211. **DLC**—Self-magnifying processes analogous to the dynamo-electric principle are frequent in meteorology, e.g., in relations between pressure and wind in frontal zones leading to wave disturbances, etc. Other examples are chain reaction in supercooled clouds, moist-labile convection, thunder rains, tropical cyclones, cold air bubbles and winter continental highs. Author then develops analogies between meandering of jet stream, ocean currents, rivers and streams, and suspects a relation between current velocity and displacement of sinuosities. (*Same item as* 3.10–109, Oct. 1952, *MAB.*) *Subject Headings:* **1. Dynamic instability 2. Jet stream analogies.**—*C.E.P.B.*

4G–94 551.510.52/3:551.557:551.513.2

Frost, R., **The upper air circulation in low latitudes and its relation to certain climatological discontinuities.** *Great Britain. Meteorological Research Committee, M.R.P.*, 706, S.C. III/122, Jan. 28, **1952.** 10 p. 13 figs., 6 tables, 18 refs., 8 eqs. Mimeo. **DWB**—Author discusses abrupt changes of tropopause in Iraq in late May and Oct., and corresponding discontinuities in surface temperature. Sections of temperature and E–W component in 40°E, 0–60°N, up to 130 mb in Jan., April, July, Oct. show a westerly jet in 26°N (Jan.) to 40° (July), crossing Iraq at time of tropopause change, and an easterly jet in July in 15°N, 100 mb. Causes of the jet streams and relations to surface conditions and sudden onset of Indian monsoon are discussed. (*Same item as* 3.7–87, July 1952, *MAB.*) *Subject Headings:* **1. Dynamic climatology 2. Jet stream 3. Easterly jet stream 4. Tropopause height 5. Iraq.**—*C.E.P.B.*

4G–95 551.513.2:551.557

Gabites, J. F., **Mean westerly wind flow between the 700 and 100 millibar levels over the New Zealand region.** *New Zealand. Meteorological Service, Technical Note*, No. 90, June **1952.** 6 p. 5 figs. 14 refs. **DWB**—Monthly mean profiles of the 700, 500, 300, 200 and 100 mb isobaric surfaces used to derive mean westerly flow between lat. 20°S and 50°S near long. 170°E. Figures show variation of mean westerly component with latitude and season at each level. Strongest winds seen in a winter time mean jet stream of 100–120 knots in lat. 25°S at the 200 mb level. *Subject Headings:* **1. Upper air winds 2. Jet stream speed.**—*G.J.E.*

4G–96 551.513.2:551.557

Gibbs, W. J., **Notes on the mean jet-stream over Australia.** *Journal of Meteorology*, 9(4):279–284, Aug. **1952.** 9 figs., 11 refs. **DWB**—From charts of pressure surfaces for 700–100 mb levels (unpublished) cross sections of geostrophic winds normal to 130° and 150°E are drawn. Winter profiles of these at 200 mb are compared with others for S. and N. Hemisphere and show general

agreement, with a peak of about 100 knots in 27°. In summer profiles are much weaker and less regular. Charts of mean speed at 200 mb over Australian region are drawn for July and Jan. showing some variation with longitude including a double jet stream in 150°E. (*Same item as* 4.2–107 and 4D–263, Feb., April 1953, *MAB.*) *Subject Headings:* **1. Jet stream 2. Australia.**—*C.E.P.B.*

4G–97 551.513.2:551.557

Hurst, G. W., **The profile of a jet stream observed 1st September, 1952.** *Great Britain. Meteorological Research Committee, M.R.P.*, 772 (rev.), Nov. 24, 1952. 4 p. 4 figs. Mimeo. **DWB**—Wind profile of a flight from Bedford to N. Scotland at 300 mb on Sept. 1, 1952 discussed. Between 55° and 56°N jet stream (110 knots) blowing from 245° was crossed. For comparison a vertical section is constructed from radiosonde ascents. *Subject Headings:* **1. Jet stream profiles 2. Scotland.**—*C.E.P.B.*

4G–98 551.557:551.513.2

Hurst, G. W., **The profile of a jet stream observed 18th January, 1952.** *Great Britain. Meteorological Research Committee, M.R.P.*, 722, April 8, 1952. 3 p. 3 figs. **DWB**—On June 18, 1952, an aircraft flew at 30,000 ft from Yarmouth to Pembroke and back on a more southerly track, crossing a well marked northerly jet stream. Vertical photographs were taken every 12 sec; the winds calculated from these fixes are presented in diagrams. They show a rapid increase from 80 knots in long. 0° to nearly 180 between 2¼ and 3°W, and a slow decrease to 160 knots in 5°W. (*Same item as* 3.10–196, Oct. 1952, *MAB.*) *Subject Headings:* **1. Jet stream profiles 2. Jet stream speed.**—*C.E.P.B.*

4G–99 551.513:551.557

Hutchings, J. W., **The winter jet-stream in the Southern Hemisphere.** *Weather*, 7(3):73–77, March 1952. 2 figs., table, 6 refs. **DWB**—Recent data confirm meridional cross section in Southwest Pacific (*see item* No. 7–40, July 1950, *MAB*) showing a jet stream in about 28°S. Winter jet is well-defined and steady without fronts, mean speed 105–110 knots. Illustrated by cross section Auckland-Guadalcanal and chart, July 27, 1945, showing jet of about 155 knots. (*Same item as* 3.5–143, May 1952, *MAB.*) *Subject Headings:* **1. Cross sections 2. Jet stream profiles 3. Jet stream speed 4. Jet stream location 5. Southwest Pacific.**—*C.E.P.B.*

4G–100 551.513.1:551.557

Ishimaru, Yukiti, **Fundamental vorticity equation and jet stream mechanism. Mechanism of the earth's atmosphere, 4th communication.** *Geophysical Magazine*, Tokyo, 24(1):41–80, Aug. 1952. 8 figs., 8 tables, eqs. **DLC**—First portion of paper deals with transformation of equations of motion to spherical polar coordinates. New equations of vorticity and of vorticity diffusion obtained. Mechanism of jet stream then investigated assuming continuous distribution of vorticity. This is followed by a consideration of the jet stream due to thermal and vorticity flow. Resulting profiles shown for each flow considered. The existence of the jet stream is shown to depend on the transport of vorticity and its mixing process. *Subject Headings:* **1. Jet stream profiles 2. Jet stream theory 3. Atmospheric circulation.**—*G.J.E.*

4G–101 551.513.1 551.557

Ishimaru, Y., **The mechanism of the earth's atmosphere (3rd communication). On the general atmospheric circulation.** *Geophysical Magazine*, Tokyo, 23(3):229–301, March 1952. 16 tables, 16 figs. **DLC**—Early work by VON HELMHOLTZ, SIEMENS, FERREL, DEDEBANT and others reviewed, then OBERBECK's work is generalized and treated for a compressible atmosphere. Numerical computation for the general circulation given in detail. Results seem to agree reasonably with observation. Mechanism of jet stream explained by distribution of vertical components of absolute vorticity. Position shown to be about 42°N in summer and 38°N in winter. *Subject Headings:* **1. Atmospheric circulation 2. Jet stream location.**—*G.J.E.*

4G–102 551.557:551.513.2

Johnson, D. H., **Further notes on the wind field of middle latitudes.** *Great Britain. Meteorological Research Committee, M.R.P.*, 761, Oct. 29, 1952. Mimeo. 5 p. 14 figs., 11 refs. **DWB**—Structure of upper westerlies in Jan. 1950 studied by daily cross sections (1000–150 mb) from Greenland to Mediterranean and Azores to Baltic, with contours of 1000 mb and 300 mb surfaces over the whole area. All showed a central maximum of jet stream type near tropopause. Summary for month includes histograms of height (peak 300–325 mb); mean velocity profiles and shear profile referred to center of jet; mean cross section Angmagsalik-Tunis, etc. (*Same item as* 4.6–151, June 1953, *MAB.*) *Subject Headings:* **1. Upper air winds 2. Jet stream location 3. Jet stream profiles.**—*C.E.P.B.*

4G–103 551.551:629.13:016

†Kramer, Mollie P. and Rigby, Malcolm, **Selective annotated bibliography on atmospheric turbulence and "bumpiness" in flight.** *Meteorological Abstracts and Bibliography*, 3(11):1185–1219, Nov. 1952. 213 refs. **DWB**—For annotated references to jet stream and atmospheric turbulence, *see items* 3K–133, –145, –151, –157, –162, –163, –168, –188 to –191, –197, –200, –208, and –209. *Subject Headings:* **1. Jet stream turbulence 2. Bibliographies.**—*M.P.K.*

4G–104 551.557:551.513.2

Krishna Rao, P. R., (*Met. Center, Madras, India*), **Probable regions of "jet" streams in the upper air over India.** *Current Science*, Bangalore, 21(3):63–64, March 1952. fig., 7 refs. **DWB**—Curves of mean temperature and mean zonal west and east components of winds (as determined from pilot balloon ascents), along 78°E up to an altitude of 20 km are presented for summer and winter. Jet streams in India are most likely to occur between 5°N and 18°N at altitudes of 16 to 18 km in summer (easterly jet) and between 22°N and 32°N at 12 to 14 km in winter (westerly jet). It is pointed out that while the westerly jet has been studied by several authors, the existence of the easterly jet has not been reported so far. (*Same item as* 3.10–197, Oct. 1952, *MAB.*) *Subject Headings:* **1. Jet stream location 2. Easterly jet stream 3. India.**—*G.T.*

4G–105 551.551:797.5

Kuettner, Joachim, **On the possibility of soaring on traveling waves in the jet stream.** *Soaring*, Memphis, Tenn., 16(3):9–14, May/June, 1952. 10 figs. **DWB**—Sailplane flights and microbarographic observations indicate the existence in the jet stream of waves (period of 20 to 30 min and wave length of more than 20 km) which theoretically travel downwind in a duct between approximately 20,000 and 40,000 ft at a velocity smaller than that of the jet stream. Relation between vertical wind shear and origin of vertical and horizontal wave motion in the free atmosphere and physical mechanism by which such motion is altered into standing waves "bounded" within "ducts" of stable air are explained. Dynamic stability of such waves discussed in an attempt to determine if jet stream forms such a "duct." (*Same item as* 3K-197, Nov. 1952, *MAB.*) *Subject Headings:* **1. Clear air turbulence 2. Jet stream turbulence 3. Gliding.**—*M.P.K.*

4G–106 551.513.2:551.557

Lamb, Hubert H., **The jet stream in the Southern Hemisphere.** *Weather*, 7(8):258, Aug. 1952. **DWB**—Brief supplementary comments to HUTCHINGS' article (*see* 4G–99 above) give further information on the latitudinal position of the Southern Hemisphere jet stream and its relation to the general circulation. *Subject Headings:* **1. Jet stream location 2. Southern Hemisphere.**—*M.P.K.*

4G–107 551.513.2:551.557

Martinez, A. W., **Why last summer was so hot.** *Colliers*, New York, Oct. 18, 1952. Condensed in *Science Digest*, Chicago, 33(2):11–15, Feb. 1953. **DWB**—Between 1938 and 1945, investigations by ROSSBY and NAMIAS are said to have established the existence and nature of the jet stream. Its causes and effects, and some of the economic importance as well as the immediate relation of the jet stream to the heat wave of the summer of 1952 (in the eastern U.S.A.) are described in a popular article. *Subject Headings:* **1. Jet stream effects 2. Heat waves 3. United States. I. Namias, Jerome E.**—*M.R.*

4G–108 551.506.7(261)(4) 551.557.35:551.547

Murray, R. and Johnson, D. J., **Structure of the upper westerlies; a study of the wind field in the eastern Atlantic and western Europe in September 1950.** *Royal Meteorological Society, Quarterly Journal*, 78(336):186–199, April 1952. 43 figs., 3 refs. **DWB**—From 60 cross sections of wind up to 150 mb, Lagens-Stockholm and Angmagsalik-Malta, in Sept. 1950, it was found that the westerlies always contain one or more centers of maximum velocity (jet streams), most frequently around 275 mb. Horizontal wind shear, shown by velocity profiles at jet stream level, averages 20 knot/100 mi on cold side and 2/3 this on warm side; vertical wind shear varies. Cross sections of winds agree well with 300 mb contours; daily charts of jet axis are shown related to surface isobars and fronts. (*Same item as* 3.8–6, Aug. 1952, *MAB.*) *Subject Headings:* **1. Jet stream 2. Upper air winds 3. Cross sections.**—*C.E.P.B.*

4G–109 551.513.2:551.557

Namias, Jerome, **The jet stream.** *Scientific American*, 187(4):26–31, Oct. 1952. 5 figs. **DWB**—General descriptive treatment of jet stream illustrated by diagrams and a sample chart. Current knowledge summed up in simple terms. ROSSBY's and NAMIAS' and CLAPP's theories of the jet stream are explained in non-technical language. In the author's interpretation jet streams originate in a "confluence of vast streams of equatorial and polar air to great heights" resulting in a localized temperature contrast through a deep layer. It is made clear, however, that no satisfactory theory

regarding formation and physical properties of the jet stream has been found as yet. Until this is done the application of observational data to practical meteorology and aviation will necessarily remain imperfect. *Subject Heading:* **1. Jet stream theory.**—*G.T.*

4G–110 551.557:551.513.2

Petterssen, S., **On the propagation and growth of jet-stream waves.** *Royal Meteorological Society, Quarterly Journal,* 78(337):337–353, July **1952.** 6 figs., 2 tables, 13 refs., eqs. **DWB**—General formulas derived (assuming adiabatic and frictionless motion) for the rates of propagation and the growth of wave shaped circulation patterns, allowing the waves any amplitude and orientation. Equations then simplified to apply to sinusoidal curves that approximate jet stream patterns. Rate of propagation shown to depend on wind speed, wave-length, the width of current and meridional variation of the Coriolis parameter. Coriolis parameter shown to be relatively unimportant. Rate of growth shown to be mainly determined by meridional variation of Coriolis parameter and by tilt of troughs and wedges in relation to the meridian. (*Same item as* 4.2–176, Feb. 1953, *MAB.*) *Subject Headings:* **1. Atmospheric circulation 2. Jet stream propagation.**—*G.J.E.*

4G–111 551.557:551.558.2

Preusche, W., **Ein Modell zur Veranschaulichung der Vertikalbewegungen in der Jet-Zone.** [A model to demonstrate vertical motion in the jet zone.] *Germany. Deutscher Wetterdienst in der U. S. Zone, Berichte,* No. 38:42–46, **1952.** 4 figs., table, 12 refs. **DWB**—A very simplified model of the vertical movements in the jet zone during a continental cold air outbreak on Nov. 25–29, 1946 over Europe is constructed from upper air data. The consequences, applicable in forecasting, are tabulated. (*Same item as* 4.2–177, Feb. 1953, *MAB.*) *Subject Headings:* **1. Jet stream models 2. Vertical motion.**—*C.E.P.B.*

4G–112 551.513:551.515.11:551.557

Queney, Paul, **Les ondes atmosphériques considérées comme associées aux discontinuités du tourbillon.** [Atmospheric waves considered as associated with vorticity discontinuities.] *Tellus,* Stockholm, 4(2):88–111, May **1952.** 10 figs., table, 8 refs. English summary p. 88–89. **DWB**—Jet stream at about 12 km level idealized as a system of two zonal currents—a simple jet, or as three zonal currents—a double jet, with uniform but differing values of absolute vertical vorticity and with wind velocity continuous at each boundary. System of equations derived for jet-stream waves. Waves of a simple jet shown to be stable, whereas double jet may have unstable waves. With both types of jets there is a maximum wave amplitude at a definite latitude. Effect of horizontal eddy viscosity discussed. Westerly simple jet may have stationary waves for any given wave number and the results do not differ essentially from those derived from ROSSBY's theory. In case of a double jet with generally two different such jets corresponding to the same given wave number, agreement with ROSSBY no longer holds. Author finally considers cyclone waves based on properties of unstable waves appearing in jet when it is slightly deformed by an additional negative absolute vertical vorticity discontinuity, the agent for which may be convection. Suggested that same theory may be applied to tropical cyclones and easterly waves. *Subject Headings:* **1. Jet stream structure 2. Double jet stream 3. Cyclone theories 4. Vorticity.**—*G.J.E.*

4G–113 551.513.2:551.557:551.515

Ramage, C. S., **Relationship of general circulation to normal weather over southern Asia and the western Pacific during the cool season.** *Journal of Meteorology,* 9(6):403–408, Dec. **1952.** 7 figs., 19 refs. **MH-BH**—A jet stream at 500 mb S of Himalayas (25–30°N) Oct.–April attributed to lifting of air from NW and resulting temperature gradient and effect of snow cover on insolation. Along this jet extratropical depressions form and move, and cold fronts intensify, and the jet coincides with axis of maximum rainfall. S. of jet is a zone of subsidence. In 17–24°N, 90–150°E convergence leads to intensified jet, subsidence and drought. The subtropical ridge is displaced northwards. The occurrence of winter cyclones east of Philippines and over SW Bay of Bengal is related to these developments. (*Same item as* 4.6–104, June 1953, *MAB.*) *Subject Headings:* **1. Jet stream 2. Atmospheric disturbances 3. Southeast Asia.**—*C.E.P.B.*

4G–114 551.513.2:551.557

Riehl, Herbert, **Northern and Southern Hemisphere jet streams.** *Weather,* 7(12):388, Dec. **1952. MH-BH**—Referring to article by HUTCHINGS (*see* 4G–99 above) points out that absence of a surface front under a jet stream in Southern Hemisphere is only apparent, due to lack of observations. (*Same item as* 4.5–95, May 1953, *MAB.*) *Subject Heading:* **1. Jet stream.**—*C.E.P.B.*

4G–115 551.509.317:551.557

Riehl, H. and Jenista, C. O., **A quantitative method for 24-hour jet-stream prognosis.** *Journal of Meteorology,* 9(3):159–166, June **1952.** 14 figs., 8 refs. **DWB**—Kinematic expressions developed

for rate of propagation of isotachs and of points (or lines) of maximum or minimum wind speed. Method of evaluation from synoptic charts given and verification described of forecasts made to date. Results indicate method has definite promise. (*Same item as* 4.3–81, March 1953, *MAB.*) *Subject Headings:* **1. Objective forecasting 2. Jet stream forecasting.**—*G.J.E.*

4G–116 551.515.8:551.557

Schmitt, W., **Two intensive polar outbreaks in the southern oceans.** *South Africa. Weather Bureau, Notos*, 1(4):193–201, **1952.** 3 tables, 4 figs., 2 refs. **DWB**—Two marked polar outbreaks are analysed and plotted. One of these was tracked from the Falkland Islands area until it approached Amsterdam Island. Here RAWIN observations showed a wind of 252 knots from 280° at 26,000 feet. A table lists the observations made over a period of four days giving wind speeds and directions up to 37,000 feet above Amsterdam Island. *Subject Headings:* **1. Polar outbreaks 2. Upper air winds 3. Jet stream.**—*G.J.E.*

4G–117 551.513.2:551.557:016

†U. S. Air Weather Service, **Bibliography on the jet stream.** *U. S. Air Weather Service, Bibliography*, No. 12, March **1952.** 9 p. **DWB**—Bibliography contains 108 references to articles published between 1949 and 1952. Entries arranged alphabetically by author. Subject classification code letter assigned to each reference. Subject coverage includes description of occurrences, forecasting; associated factors such as turbulence, clouds, pressure systems, etc.; causes; dynamics; historical development and geographical area. *Subject Headings:* **1. Jet stream bibliographies 2. Bibliographies 3. Zonal circulation.**—*M.R.*

4G–118 551.557

Winchester, James H., **High altitude winds.** *Aviation Age*, N. Y., 17(4):42–43, April **1952.** 2 charts. **DWB**—Popular descriptive article on history, physical characteristics and behavior patterns of the jet stream as well as its relation to tropopause, free air turbulence, jet transport and general circulation. Information based on Air Weather Service investigations and research. *Subject Heading:* **1. Jet stream.**—*M.P.K.*

4G–119 551.513.2:551.557

§Winston, Jay S., **Confluence and the jet stream over the Atlantic and North America during January 1949.** U. S. Weather Bureau, Extended Forecast Section, Sept. **1952.** 9 p. 6 figs., refs. **DWB**—Studies convergence of air currents using mean 700 and 500 mb charts for the whole month and a selected five day period. Mean horizontal temperature advection mapped for the layer at sea level to 10,000 ft and 700 to 500 mb. Advection gradients are computed and an attempt made to explain the physical features of this process. *Subject Headings:* **1. Large scale weather processes 2. Jet stream theory 3. Temperature advection. I. U. S. Weather Bureau. Extended Forecast Section.**—*A.A.*

1953

4G–120 551.551:551.557:656.7

Arakawa, Hidetoshi, **Clear-air turbulence near the jet stream.** *Royal Meteorological Society, Quarterly Journal*, 79(339):162–163, Jan. **1953.** table, 6 refs., eq. **DWB**—Criterion of cyclonic shear for turbulent motion in zonal flow is $-\frac{\partial u}{\partial y}=\omega \sin\phi+\frac{2u}{R}\tan\phi$ where u = zonal wind. Values are given for $\phi=40-65$, u up to 115 knots. (*Same item as* 4.6–140, June 1953, *MAB.*) *Subject Headings:* **1. Clear air turbulence 2. Jet stream.**—*C.E.P.B.*

4G–121 551.513:551.515

Aubert, E. J., Clem, L. H., Klein, W. H., Winston, J. S., Hawkins, H. F. and Martin, D. E., **The weather and circulation of November, December 1950. April, May, November 1951. January April . . . August, October, December 1952. January . . . March 1953.** *Monthly Weather Review*, 78:201–203, 217–219, Nov., Dec. **1950;** 79:71–73, 96–99, 208–211, April, May, Nov. **1951;** 80:7–9, 70–72, 82–87, 99–104, 118–122, 134–137, 190–194, 246–249, Jan., April–Aug., Oct., Dec. **1952;** 81:16–19, 43–46, 77–81, Jan.–March **1953.** figs., refs. **DWB**—Each of these monthly articles contains a mean 700 mb chart showing pressure contours, 700 mb height departures from normal, anomaly centers and minimum latitude trough locations. Also included are smaller charts indicating mean geostrophic (total horizontal) wind speed at 700 mb with lines delineating the axes of maximum wind speed (jets) for the month in question. The July, Aug. and Dec. 1952 and the 1953 charts show 200 mb jets. Most articles also contain charts showing the vertical component of mean relative geostrophic vorticity at 700 mb (or 200 mb) with areas of cyclonic and anticyclonic vorticity (in excess of or less than specified vorticity values, respectively) indicated. (*Same item as* 3.6–7, June

1952, *M.A.B.*) *Subject Headings:* **1. Jet stream 2. Upper air pressure 3. Upper air winds 4. Vorticity 5. United States.**—*M.P.K.*

4G–122 551.513.1

Freeman, John C., **A jet stream model.** Abstracted in: American Meteorological Society, 20th National Meeting, Program, New York City, Jan. 26–29, 1953. p. 395. **DWB**—Circumpolar jet stream shows variation of wind speed and width with longitude and time. A nonlinear model based on three circumpolar bands of constant absolute vorticity in a barotropic atmosphere imitates these changes to a marked degree. In addition, in this model there is a critical velocity that must be attained before a block (a marked split in the jet stream) is possible. This critical velocity is of the order of 50 mps and thus is large enough to be tested as a criterion for blocking. The model predicts an increase in the width of the jet stream at the time a block occurs, as has been demonstrated synoptically by Rex (1950). In addition, this barotropic model allows an increase in the maximum speed of the westerlies and shows that isotachs in a strong narrow jet travel at much less than the wind speed. *Subject Headings:* **1. Jet stream 2. Jet stream models.**—*Author's abstract.*

4G–123 551.557.3(931)

Gabites, J. F., **Mean westerly wind flow in the upper levels over the New Zealand region.** *New Zealand Journal of Science and Technology, Sec. B,* 34(5):384–390, March **1953.** 3 figs., 2 tables 10 refs. Also: *New Zealand. Meteorological Service, Meteorological Office Note,* No. 38, **1953.**—Mean wind flow at 10,000 and 50,000 ft levels, 20°–50°S in New Zealand region estimated from monthly mean radiosonde and radar pilot balloon data. Flow is from west all year with highest speeds in latitudes 25°–30°S in a mean jet stream near 45,000 ft level with maximum speed of 120 knots in winter decreasing to 50 knots in late summer. Mean flow relatively weak in latitudes 40°–45°S all year. *Subject Headings:* **1. Jet stream speed 2. Jet stream location 3. Upper air winds 4. New Zealand 5. Southern Hemisphere.**—*From author's abstract.*

4G–124 551.513:551.515:551.524.7:551.557

Gibbs, W. J., **A comparison of hemispheric circulations with particular reference to the western Pacific.** *Royal Meteorological Society, Quarterly Journal,* 79(339):121–136, Jan. **1953.** 19 figs., 2 tables, 13 refs. **DWB**—Author compares distribution of pressure systems in both hemispheres and proceeds to construct meridional cross sections of mean zonal winds for the western Pacific for the mid-months of each season. Main features of circulation in Australian region discussed. Tables give mean geostrophic west wind for Northern and Southern hemispheres between longitude 120° and 180°E, for various latitudes and for levels up to 100 mb. Figures show cross-sections of mean zonal winds for Jan., April, July and Oct. for a sector centered on long. 150°E and extending from the surface to the 100 mb level. Easterly circulation in low latitudes appears to be strongest above the 100 mb level, where an easterly jet may occur. Westerly circulation of higher latitudes has maximum at about 200 mb in subtropical latitudes. It varies from 80 knots in winter to 50 knots in summer. (*Same item as* 4D–270, April 1953, *M.A.B.*) *Subject Headings:* **1. Atmospheric circulation 2. Atmospheric disturbances 3. Upper air temperatures 4. Upper air winds 5. Jet stream 6. Meridional cross sections 7. Western Pacific.**—*G.J.E.*

4G–125 551.510.52:551.524.7(54)

Koteswaram, P. (*Meteorological Office, Poona*), **An analysis of the high tropospheric wind circulation over India in winter.** *Indian Journal of Meteorology and Geophysics,* 4(1):13–21, Jan. **1953.** 9 figs., table, 17 refs. **MH-BH**—Distribution of winds and temperature at various heights (500–100 mb) along roughly longitude 80°E discussed for two days of approximately westerly flow in winter. Existence of "jet streams" over Northern India in the high troposphere observed and thermal and wind structures associated with the streams discussed. Jet stream occurring in association with break in tropopause classified as the polar front type. Jet stream found entirely in the tropical troposphere called the sub-tropical type as postulated by Palmén. *Subject Headings:* **1. Upper air wind observation 2. Jet stream 3. Northern India.**—*From author's abstract.*

4G–126 551.513:551.557

Mironovitch, M. V., **Représentation de la circulation atmosphérique générale pour une coupe aérologique méridienne à travers les deux hémispheres.** [Representation of the general circulation by a meridional aerological cross-section across both hemispheres.] *Academie des Sciences, Paris Comptes Rendus,* 236(4):404–406, Jan. 26, **1953.** **DLC**—Using all available information and choosing the 150°E meridian as having best selection of data for Southern Hemisphere, vertical meridional cross-sections are drawn for each season across both hemispheres to a height of 22 km. Isopleths of easterly and westerly geostrophic components included. Considerable differences immediately obvious in isobaric and thermal structure of the atmosphere in the two hemispheres, the Southern Hemisphere being colder. In the zonal flow, several maxima (jets) are seen. Easterly jets pass

from one side of the equator to the other with the summer season. *Subject Headings:* **1. Atmospheric circulation 2. Jet stream 3. Meridional cross sections.**—*G.J.E.*

4G–127 551.513.2:551.557

Riehl, Herbert and Teweles, Sidney, Jr., **A further study on the relation between the jet stream and cyclone formation.** *Tellus*, 5(1):66–79, Feb. **1953.** 10 figs., refs. **DWB**—Events at sea level and aloft over the United States are related to the approach of a speed maximum in the jet stream. In the left hand portion of the area downstream from the jet maximum where air at the jet level is decelerating, frontogenesis, cyclogenesis, and spread of precipitation occur. Other indications of high level divergence to the left of the advancing jet maximum are given by changes in the structure of a nearby cold dome. Insofar as the changes in the cold dome are precedent, they constitute a means of forecasting cyclogenesis. *Subject Headings:* **1. Jet stream 2. Cyclogenesis.**—*Authors' abstract.*

4G–128 551.513.2:551.557:551.576.1

Schaefer, Vincent J., **Cloud forms of the jet stream.** *Tellus*, 5(1):27–31, Feb. **1953.** 9 figs., color photos, refs. **DWB**—Combination of four cloud types including specific forms of cirrus, cirrocumulus and altocumulus have been successfully correlated with the reported location of the major axis of the jet stream. Recognition of these cloud patterns from the air as well as from the ground may prove to be a simple method for locating the high velocity component of the jet. Field observations of these spectacular clouds have been made at various parts of the United States as well as Scandinavia, Switzerland, and Great Britain. More than 500 feet of time-lapse motion pictures have been obtained of such clouds and show remarkable high velocity, shear, turbulence and waves which typify portions of this velocity stream of air. These cloud structures display the coherency and the high rate of motion which would be expected of the jet stream. Detailed studies by time-lapse photography should establish more of the physical properties of this important component of the atmosphere. *Subject Headings:* **1. Jet stream cloud formations 2. Cloud observations.**—*Author's abstract.*

4G–129 551.513.2:551.557

U. S. Bureau of Aeronautics (Navy), **Operational research into the detailed structure of the jet stream.** Project AROWA (TED-UNL-MA-501.15), Second Quarterly Progress Report, Jan. 1–April 1, **1953.** 7 p. **DWB**—Brief account of the twelve jet probing flights accomplished in the first quarter 1953 chiefly over the eastern U. S. Mention made of maximum velocities encountered, approximate jet orientation and relation of jet to 300 mb trough. *Subject Headings:* **1. Jet stream structure 2. Eastern United States. I. Project AROWA (TED-UNL-MA-501.15).**—*M.P.K.*

SUPPLEMENTARY MATERIAL

4G–130 551.513.2:551.557

Fireball shows superstratosphere winds blow at 200 m.p.h. *American Meteorological Society, Bulletin*, 19(9):413, Nov. **1938. DWB**—Brief note of historical interest. Evidence of jet stream over Texas and Oklahoma. *Subject Headings:* **1. Jet stream 2. Texas 3. Oklahoma.**—*M.P.K.*

4G–131 551.513.2:551.557:551.547.1

Fletcher, Robert D., **The association of wind speed with height of upper-air constant-pressure surface.** *American Meteorological Society, Bulletin*, 34(4):155–159, April **1953.** 6 figs., 3 refs. **MH-BH**—It is brought out that axes of strong-wind currents have preferences for particular contour heights on upper-air constant-pressure surfaces. The tendency for coincidence of contour lines and strong-wind axes is emphasized as an aid in upper-wind forecasting. A climatological study also demonstrates a consistent average relation between wind speed, contour height and latitude. *Subject Headings:* **1. Jet stream 2. Constant pressure surfaces 3. Upper air wind forecasting.**—*Author's abstract.*

4G–132 551.513.2:551.557

"The jet was chasing its tail." *General Electric Review*, 56(4):42–47, July **1953.** figs., photos. **DLC**—Popular summary of the research underway at the General Electric Laboratory near Schenectady aimed at locating the jet stream by a combination of the cloud observation (*see* 4G–128 above) and radioactive point-collector (Falconer—abnormal amount of atmospheric electricity recorded when jet is within 150 mi) methods. *Subject Headings:* **1. Jet stream forecasting 2. Jet stream turbulence.**—*M.P.K.*

4G–133 551.513.2:551.557

Johnson, D. H., **Jet stream of October 28, 1952.** *Meteorological Magazine*, London, 82(972): 8–182, June 1953. 5 figs. **DWB**—With a deep depression NW of Ireland a jet stream flowed om SW over British Isles at an unusually low level (19,000 ft; second peak at 27,000 ft). Develop- ent is shown by 300 mb charts and cross sections. Structure resembles a frontal layer separating o barotropic air masses. *Subject Headings:* **1. Jet stream height 2. British Isles.**—*C.E.P.B.*

4G–134 551.513:551.557(54,591)

*Koteswaram, P., Raman, C. R. V. and Parthasarathy, S., **The mean Jet Stream over India and rma in winter.** *Indian Journal of Meteorology and Geophysics*, 4(2):111–122, April 1953. 12 figs., ables, 10 refs., eqs. **DWB**—Mean cross section constructed for Dec.–Feb. period using all avail- le radiosonde and sounding balloon data for India, Pakistan and Burma. Mean contours and therms given for the 500, 300, 200 and 150 mb levels over the sub-continent for this period. ean jet of the sub-tropical type is found to exist at about 27°N and at about 12 km height. Its operties are compared with the polar front type. No mean jet found at lower latitudes. *Subject adings:* **1. Jet stream profiles 2. India 3. Burma.**—*G.J.E.*

4G–135 551.513.2:551.557

§Murray, R., **The jet streams over the British Isles during June 14–18, 1951.** *Meteorological agazine*, London, 82(971):129–140, May 1953. 8 figs., 7 refs. **MH-BH.** Also in: *Great Britain. eteorological Research Committee, M.R.P.*, 743, Aug. 16, 1952. 8 p. 19 figs., 9 refs. Mimeo. **WB**—A long-wave trough with associated depression north of Scotland is shown by surface and 0 mb charts. Vertical wind and temperature sections show a cold frontal zone and two jet streams. he moved rapidly SE into Europe, dying out June 16, the other moved SE across British Isles at out 5 knots, becoming dominant June 15. Their average lateral speed (7.9 knots) compares with ostrophic component of 6.5 Knots. Changes in wind maxima were related to changes of mean ermal gradient of troposphere. A model for tropopause structure and development during jet eams is put forward. (*Same item as* 4.5–133, May 1953, *MAB.*) *Subject Headings:* **1. Jet stream Tropopause—wind relationships 3. British Isles.**—*C.E.P.B.*

4G–136 551.515.11:551.513.2

Queney, Paul (*Paris Univ.*), **La résonance interne du jet-stream et son rôle dans la formation s cyclones.** [Internal resonance of the jet stream and its role in the formation of cyclones.] *dian Academy of Sciences, Bangalore, Proceedings, Sec. A*, 37(2):213–222, Feb. 1953. 28 eqs. **LC**—The author develops the theory of elementary waves composed of a system of two Couette rrents, in two stages: (a) fundamental waves and (b) convective waves. Then he considers sonance in such a system, and application to the cyclone theory. He comes to the conclusion that cyclone wave is nothing more than a resonance wave produced in the jet stream by a local vertical dy disturbance. *Subject Headings:* **1. Cyclogenesis 2. Jet stream waves 3. Internal resonance jet stream.**—*M.R.*

4G-137 551.594.1(74) 551.513

Falconer, Raymond E., **A correlation between atmospheric electrical activity and the jet stream.** *eneral Electric Research Laboratory, Schenectady, N. Y., Report*, No. RL-900, July 1953. 14 figs., tables, 7 refs. **DWB**—A radioactive collector and a sensitive recording microammeter have been ed for several years to indicate variation in the potential gradient of the atmosphere at the General ectric Research Laboratory. Good correlation found recently between magnitude of current easured on fair-weather days and the presence of the jet stream over the area. On fair-weather ys, Oct. 1952–Feb. 1953, when the radioactive collector current exceeded +0.05 microampere r a few hours or more, a jet stream was indicated over Schenectady at the 500, 300, or 200 mb vels on 42 or 50 days (80%). Relation suggests that jet stream may carry a higher positive charge ossibly acquired as it passes over thunderstorms or other stormy areas previous to its arrival over region of fair weather) sufficient to increase the normally positive fair-weather field under the region the jet stream. *Subject Headings:* **1. Jet stream 2. Atmospheric electricity 3. Jet stream recasting.**—*From author's abstract.*

PART III. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The contents of periodicals included in this section are for information only, and will not be listed in the monthly indexes until abstracted. When material is furnished in advance of date of publication, the pagination may be omitted.

Akademiia Nauk SSSR, Izvestiia, Seriia Geofizicheskaia, Number 1, 1953.

SHtokman, V. B.: **Nekotorye voprosy dinamiki morskikh techenii,** [Some problems of the dynamics of ocean currents], p. 69–77.

SHishkin, N. S.: **Nekotorye fizicheskie zakonomernosti fazovykh prevrashchenii gidrometeorov** [Some physical regularities of the phase transformation of hydrometeors], p. 78–82.

IAroslavtsev, I. N.: **Raspredelenie iarkostei po nebu,** [Distribution of sky brightness], p. 83–94

Number 2, 1953.

Lineĭkin, I. S.: **Ob izmenenii solenosti poverkhnostnogo sloia moria pri vypadenii osadkov** [Change of salinity in the surface layer of the sea during rainfall], p. 148–154.

Obukhov, A. M.: **O vliianii slabykh neodnorodnostei atmosfery na raspredelenie zvuka i sveta** [The influence of weak atmospheric heterogeneities on dispersion of sound and light], p. 155–165.

Berliand, M. E.: **Izmenenie temperatury v prizemnom sloe atmosfery i predskazanie zamorozkov,** [Temperature variation in the atmospheric layer near the ground and frost forecasting], p. 166–182.

Kaganov, M. A. and CHudnovskiĭ, A. F.: **Ob opredelenii koeffitsienta temperaturoprovodnosti pochvy,** [Determination of the coefficient of temperature conductivity of the soil], p. 183–190.

Frenkel', IA. I.: **O fotokhimicheskom mekhanizme vozniknoveniia iader kondensatsii v zemnoĭ atmosfere,** [Photochemical mechanism in the formation of condensation nuclei in the earth's atmosphere], p. 191–192.

Archiv für Meteorologie, Geophysik und Bioklimatologie, Serie B, Volume 4, Number 4, 1953.

Grunow, Johannes: **Kritische Nebelfroststudien. Nach Beobachtungen auf den Hohenpeissenberg,** [Critical studies of rime. From observations on Hohenpeissenberg], p. 389–419.

Karapiperis, Leon N.: **On the spells of cold weather over the East Mediterranean during the autumn,** p. 420–430.

Ekhart, E.: **Über den täglichen Gang des Windes im Gebirge,** [On the daily wind variations in mountains], p. 431–450.

Hoinkes, H.: **Zur Mikrometeorologie der eisnahen Luftschicht,** [On the micrometeorology of the air layer near the ice], p. 451–458.

Reuter, H.: **Theoretische Betrachtungen über die Veränderlichkeit von Jahresmitteltemperaturen,** [Theoretical considerations on the variability of mean annual temperatures], p. 459–469.

Ehrenberg, Wolfgang W.: **Künstliche Geländefärbung als Beispiel für "physikalische Katalyse,"** [Artificial surface coloration as an example of "physical catalysis"], p. 470–482.

Geophysical Magazine, Tokyo, Volume 24, Number 2, November 1952.

Sakuraba, S.: **The mechanism of alternation of vertical lability of the atmosphere in summer and its application to heat-thunderstorm forecasting,** p. 81–107.

Sakuraba, S.: **On the change of potential energy in a cyclone,** p. 109–116.

Sakuraba, S.: **A note on the transformation of kinetic energy by large scale eddy stresses,** p. 117–122.

Tojo, S.: **The dynamics of a vortex embedded in a constant zonal current,** p. 123–128.

Kasahara, A.: **The structure of a tropical cyclone in the incipient stage,** p. 129–154.

Number 3, January 1953.

Terada, K. and Osawa, K.: **On the energy exchange between sea and atmosphere in the adjacent seas of Japan,** p. 155–170.
Suzuki, S.: **Differential recorders of meteorological elements,** p. 171–180.
Sakuraba, S.: **On the change of energies in a tropical cyclone,** p. 181–192.

ournal of Atmospheric and Terrestrial Physics, Volume 3, Number 4, May 1953.

Nolan, P. J. and Kenny, P. J.: **Anomalous loss of condensation nuclei in rubber tubing,** p. 181–185.
Lewis, R. P. Waldo and McIntosh, D. H.: **Diurnal and storm-time variations of geomagnetic and ionospheric disturbance,** p. 186–193.
van Sabben, D.: **Relationship between radio-propagation disturbance, geomagnetic activity and solar noise,** p. 194–199.
Nicolet, Marcel: **The collision frequency of electrons in the ionosphere,** p. 200–211.
Bates, D. R. and Griffing, G.: **Scale height determinations and auroras,** p. 212–216.
Dawton, D. I. and Elliot, H.: **Day and night measurements of the total cosmic ray intensity at balloon altitudes,** p. 217–222.
Chalmers, J. Alan: **Atmospheric electrical conductivity near the earth's surface,** p. 223–224.

Meteorological Society of Japan, Journal, Volume 30, Number 10, October 1952.

Suzuki, S.: **Orographic influence on atmospheric pressures and currents (V),** p. 305–312.
Uwai, K.: **Analysis of a cyclone in middle latitudes near Japan (I),** p. 313–328.
Ogura, Y.: **Note on the wind velocity profile in the non-adiabatic atmosphere,** p. 329–342.
Sakuraba, S.: **A closed system and an open system in energy computation,** p. 342–344.

Number 11, November 1952.

Kumai, M. and Higuchi, K.: **Measurement of the mass and number of falling snow crystals in the atmosphere,** p. 345–355.
Tsukamoto, K. and Yajima, Y.: **Combination wind vane and anemometer for remote recording (1st part),** p. 355–365.
Kato, T.: **Air temperature in Tokyo and its neighbourhood,** p. 365–371.
Dr. Robert D. Fletcher, p. 371–377.

Number 12, December 1952.

Okita, T.: **Electron-microscopic study of ice-crystal nuclei in the atmosphere,** p. 379–385.
Ogura, Y.: **The theory of turbulent diffusion in the atmosphere. III. (The theoretical distribution of airborne pollution from tall stacks),** p. 386–397.
Tsukamoto, K. and Yajima, Y.: **Combination wind vane and anemometer for remote recording (2nd part),** p. 398–402.
Watanabe, T.: **On the four-day periodicity,** p. 403–404.
Sakuraba, S.: **The relation between a closed system and an open system in energy computation,** p. 404–405.

Volume 31, Number 1, January 1953.

Inoue, E.: **A preliminary note on the atmospheric turbulent diffusion over rough surfaces,** p. 1–5.
Sato, T.: **On the problem of the mathematical insolation (III),** p. 6–17.
Yamamoto, T.: **Some considerations about the mechanism of secular trends of the climate of Japan,** p. 19–21.
Kasahara, A.: **A note on the vertical structure of the pressure and temperature fields in a typhoon,** p. 22–35.
Sakuraba, S.: **A note on the energy transformation in a typhoon,** p. 36.

Number 2, February 1953.

Kitagawa, N., Iizuka, T., Murai, K. and Kobayashi, M.: **Location of atmospherics and their relation to meteorological phenomena,** p. 37–50.
Saito, Naosuke: **An aerological study of the cold vortex and stationary front in summer in the Far East,** p. 51–59.
Kurihara, S.: **Statistical research on visibility,** p. 60–75.

Number 3, March 1953.

Ozawa, T. and Fujita, T.: **Climatic change in the Tohoku District, III,** p. 77–94.
Ogawara, M. and Yamazaki, H.: **Singularities in the annual variation of temperature in Japan,** p. 95–116.

Marine Observer, London, Volume 23, Number 161, July 1953.

Work of the year (ending 31st March, 1953) of the Marine Branch of the British Meteorological Office and the Voluntary Observing Fleet, p. 120.
The Marine Observer's log—July, August and September, p. 132.
The Cutty Sark, p. 149.
Ocean Meteorological networks, p. 151.
Routes of British observing ships, p. 155.
Reports from Hong Kong and Mauritius Observatories, p. 156.
Paton, James: **Aurora borealis,** p. 159.
Ocean swell and microseisms, p. 164.
Fleet lists, p. 165.
Notices to marine observers, p. 188.
Southern ice reports, p. 188.

Meteorological Magazine, London, Volume 82, Number 972, June 1953.

Dr. A. H. R. Goldie, C.B.E., F.R.S.E., p. 161–163.
Sutcliffe, R. C.: **The formation of new anticyclones,** p. 163–175.
Pothecary, I. J. W.: **Clear-air turbulence at 20,000 ft. in a frontal zone,** p. 175–178.
Johnson, D. H.: **Jet stream of October 28, 1952,** p. 178–182.
Meteorological Research Committee, p. 182.
Royal Meteorological Society, p. 183.
Royal Ornithological Club, p. 184–185.
Painting, W. B.: **Remarkable changes in the screen temperature at Waddington,** p. 185–188.
Frankcom, C. E. N.: **Exposure of instruments on an ocean weather ship,** p. 188.
Large pressure variations, p. 188.
Mammatus cloud, Rickinghall, Suffolk, October 24, 1952, p. 188–189.

Monthly Weather Review, Volume 81, Number 3, March 1953.

Colón, José A.: **A study of hurricane tracks for forecasting purposes,** p. 53–66.
Sanders, R. A.: **Blocking highs over the Eastern North Atlantic Ocean and Western Europe,** p. 67–73.
Cook, A. W.: **Summary of tornadoes in Colorado, Wyoming, and New Mexico,** p. 74–76.
Klein, William H.: **The weather and circulation of March 1953—including review of this year's mild winter,** p. 77–81.
Lennahan, Charles M. and Holzworth, George C.: **Cyclogenesis and floods associated with stagnant cold low, March 25–30, 1953,** p. 82–89.

Oceanographical Magazine, Tokyo, Volume 4, Number 1, August 1952.

Miyazaki, M.: **On the sea level variations accompanied with the travelling atmospheric disturbances,** p. 1–12.
Miyazaki, M.: **Mathematical studies of surf and breakers—nonlinear wave theory in shallow water of constant slope—(II),** p. 13–22.

Number 2, October 1952.

Miyazaki, M.: **Notes on the theory of the wind-driven oceanic circulation,** p. 31–36.
Ichye, T.: **On the variation of oceanic circulation (III),** p. 37–48.
Masuzawa, J.: **On the heat exchange between sea and atmosphere in the southern sea of Japan,** p. 49–56.
Fukuoka, J. and Yusa, T.: **The variation of the oceanic condition in the sea adjacent to Tohoku District,** p. 57–65.

Weather, London, Volume 8, Number 6, June 1953.

Lawrence, E. N.: **June and drought in Britain,** p. 163–164.
Garnett, Lee: **Instrumentitis,** p. 165–167.
Professor Carl-Gustaf Rossby, Symons Medallist, 1953, p. 168.
Staven, H. M.: **Wind and the forest,** p. 169–174.

Lamb, H. H.: **British weather around the year—2,** p. 176–182.
Green, F. H. W.: **A remarkable low humidity,** p. 182–184.
Crawford, Stanley G.: **Barograph antics,** p. 192.

International Union of Geodesy and Geophysics, International Association of Scientific Hydrology, [Transactions] Oslo 1948, Volume 1.

Smolik, Ladislav: **The water evaporation from a South Moravian soil during the very dry year 1947,** p. 55–59.
Report by Mr. W. Allard (Great Britain), p. 60–61.
Melin, Ragnar: **The evaporation in Sweden,** p. 62–63.
Bac, M. Stanislaw: **Transpiration des végétaux de prairies et évaporation des sols non-couverts. Étude basée sur des observations en lysimètres sur le niveau effectif de la nappe souterraine,** [Transpiration of prairie vegetation and evaporation from bare soils. Study based on lysimeter observations at the effective underground layer], p. 65–74.
Ostromecki, Jerzy: **Les recherches de l'équilibre du bilan d'eau des bassins marécageux améliorés. Partie II.—La carte des besoins d'eau,** [Research on the equilibrium of the water balance of reclaimed bogs. Pt. II—Chart of water needs], p. 75–82.
Roslonski, R.: **Le bilan du circuit des eaux d'un bassin et la méthode de son calcul,** [Balance of the water circulation in a watershed and method of calculation], p. 83–97.
Harbeck, G. Earl, Jr.: **Present status of work on evaporation in the United States,** p. 98–104.
Coutagne, M.: **L'évaporation des surfaces d'eau naturelles,** [Evaporation from natural water surfaces], p. 105–106.
Dienert, M. M. and Henin, S.: **Du bilan de l'eau,** [Water balance], p. 107–115.
Sanderson, M.: **Outline of memorandum of the present state of work on evaporation in Canada,** p. 116.
Central Hydrographic Service: **Precipitation, run-off and losses of the Italian drainage areas,** p. 117–128.
Siren, Allan: **The drainage basin evaporation in Finland,** p. 129–130.
Tonini, Dino: **On the research of a characteristic time of runoff,** p. 131–139.
Fry, Albert S.: **Recent developments in hydrology with respect to stream flow forecasting,** p. 143–151.
Johnson, Nelson: **Potamology in the United Kingdom,** p. 152–153.
Newnham, W. L.: **Report on potamology,** p. 154–156.
Wicht, C. M.: **Potamology in the Union of South Africa,** p. 157–163.
Travaux hydrographiques exécutés de 1939 à 1947, [Hydrographic work carried out from 1939–1947], p. 164–167.
Hendry, M. C.: **Report to the hydrological association commission on potamology,** p. 168.
Mosonyi, Emil: **Natural storage effect in the mountainous drainage areas of the Carpathian basin,** p. 169–176.
Simaika, Y. M.: **Century storage reservoirs and the complete control of the Nile,** p. 177–179.
Hoeck, E.: **Sur les mesures pluviométriques dans le bassin de la Baye de Montreux,** [Pluviometric measurements in the Baye de Montreux Basin], p. 180–190.
Oesterhaus, Max: **Mehrjärige (*sic*), periodische Schwankungen der Ablussmengen (*sic*) des Rheins bei Basel,** [Several years of periodical discharge fluctuations of the Rhine at Basel], p. 191–202.
Pardé, Mauricé: **Investigation sur la chronologie des averses,** [Investigation into the chronology of heavy rains], p. 203–208.
Thijsse, J. Th.: **Prévision du débit du Rhin,** [Forecasting the runoff of the Rhine], p. 209–212.
Klaeboe, H.: **Fluctuations in run-off,** p. 213–214.
Tison, L. J.: **Nouvelle méthode pour la détermination de la vitesse moyenne et du débit d'un cours d'eau,** [New method of determining mean speed and runoff of a watercourse], p. 215–216.
Raffo, Jose M.: **Equipment to perform gaugings form (*sic*) the margins,** p. 217–220.
Linsley, R. K.; Foskett, L. W. and Kohler, M. A.: **Use of electrical analogy in flood wave analysis,** p. 221–227.
Goldschmidt, M. J.: **Storm water run-off in Palestine,** p. 228–250.
McClean, W. N.: **Loch Quoich and the Balance Sheet of a lake,** p. 319.
Volker, Adrien: **Bilan d'eau du lac Ijssel,** [Water balance of Lake Ijssel], p. 320–326.
de Marchi, G.: **Caractéristiques hydrologiques et hydrauliques des grands lacs subalpins,** [Hydrological and hydraulic characteristics of great sub-alpine lakes], p. 327–331.
Bergsten, Folke: **The duration of the waterstages of the Swedish lakes Vänern and Storsjön,** p. 335–343.
Volker, Adrien: **Le niveau moyen du lac Ijssel,** [Mean water level of Lake Ijssel], p. 344–347.

McClean, M. N.: **Loch Lochy, extreme levels and flows,** p. 348.
Harding, S. T.: **Statistics of lake levels. (With special reference to the magnitude and duration of fluctuations),** p. 349–357.
Renqvist, H.: **Lake level statistics from Finland,** p. 358–359.
Tison, L. J.: **Variations des niveaux du lac Tanganika,** [Water level variations of Lake Tanganika], p. 360–362.
Johnsson, Harald: **Wind currents in lake Klammingen,** p. 367–372.
Melin, Ragnar: **Currents caused by water flowing through lakes,** p. 373–377.
Hellström, B.: **Wind currents in lake Brunnsviken,** p. 378.
Diénert, M. F. and Guillerd, A.: **"Mouvement de l'eau dans les lacs,"** [Water movement in lakes], p. 379–385.
Volker, Adrien: **Mouvements des eaux dans le lac Ijssel,** [Water movements of Lake Ijssel], p. 386–391.
Tison, L. J.: **Courants dans les réservoirs et les lacs,** [Currents in reservoirs and lakes], p. 392–394.
Kaitera, Pentti: **Keeping the water from freezing by means of compressed air,** p. 395–396.

Volume 2.

de Sampaio Ferraz, J.: **Northern sea ice and rainfall in S. E. Brazil,** p. 22.
Korhonen, V. V.: **Rapport general,** [General report], p. 25–29.
Korhonen, V. V.: **Report of the researches concerning snow- and ice conditions, which have been made in Finland after 1936,** p. 31–32.
Jurva, R.: **Sur les conditions de glace de la Baltique le long des côtes de Finlande,** [Ice conditions of the Baltik along the coasts of Finland], p. 33–37.
Kaitera, Pentti: **Snow melting in the spring and its effects on the opening of the waterways in Finland,** p. 38.
Korhonen, V. V.: **Correction des mesurages des chutes de neige faite sur la base de la nature de la place de mesurage,** [Corrections of snowfall measurements according to the characteristics of the place of measurement], p. 39–40.
McClean, W. N.: **Flooding due to the melting of snow and ice,** p. 41.
Gerdel, R. W.: **Physical changes in snow-cover leading to runoff, especially to floods,** p. 42–54.
de Quervain, Marcel: **Ueber den Abbau der alpinen Schneedecke,** [On the ablation of Alpine snow covers], p. 55–68.
Rhodes, F. L. and Wilson, W. T.: **The cooperative Snow Investigations Program. Its objectives and operations,** p. 69–85.
Hoover, O. H.: **Effects of chinook (foehn) winds on snow cover and runoff,** p. 86–100.
Heinsheimer, G.: **On the relation of precipitation accumulation and melting of snow to the stream flow in the San Juan River, Argentine,** p. 101–108.
Observations of Himalayan snowfall and snow-cover by the India Meteorological Department, p. 109–114.
Church, James E.: **The evolution of snow-melt by dyes and drip-pan,** p. 115–117.
Church, James E.: **Standardizing method of snow cover measurement: ten years comparison of forecasting runoff of the Colorado River (U.S.A.) by snow surveys and measurement of precipitation,** p. 118–127.
Legget, R. F.: **Canadian interest in snow and ice research,** p. 128–137.
Klein, G. J.: **Canadian survey of physical characteristics of snow-covers,** p. 138–152.
Smith-Johannsen, Robert: **Snow data,** p. 153–156.
Schaefer, Vincent J.: **The development of a snow classification system,** p. 157–160.
Mörikofer, Walter: **The dependence on altitude of the snow cover in the Alps,** p. 161–170.
Bucher, Edwin: **Sur l'activité de l'Institut Fédéral pour l'Étude de la Neige et des Avalanches au Weissfluhjoch sur Davos, Suisse,** [The activities of the Federal Institute for Snow and Avalanche Study at Weissfluhjoch, Davos, Switzerland], p. 171–174.
Pardé, Maurice: **Influence de la couverture nivale sur le ruissellement et specialement sur les inondations,** [Influence of the snow cover on runoff and especially on floods], p. 175–181.
Lundquist, Roy E.: **Tentative report and abstract,** p. 182–185.
Schaefer, Vincent J.: **The formation of ice crystals in the laboratory and in the atmosphere,** p. 186–210.
Renaud, André: **Contribution à l'étude du grain de glacier,** [Contribution to the study of the structure of glaciers], p. 213–215.
Seligman, Gerald: **The growth of the glacier crustal,** p. 216–220.
Ahlmann, Hans Welhelmson and Droessler, E. G.: **Glacier ice crystal measurements at Kebnekajse, Sweden,** p. 221–227.
Faegri, Knut: **On the variations of Western Norwegian glaciers during the last 200 years,** p. 293–303.

Mauley (*sic*), Gordon: **Glacier variations and climatic fluctuations in Britain,** p. 304–305.
Haefeli, R. and Kasser, P.: **Observations in the firn and ablation regions of the Great Aletsch Glacier,** p. 306–322.
Billwiller, R.: **Die kurzfristigen Schwankungen der Alpengletscher und ihre Ursachen,** [Short fluctuations of Alpine glaciers and their causes], p. 323–328.
Heinsheimer, George J.: **Horizontal age differences in glaciers,** p. 329–331.
Marchetti, Eug. Adolfo A.: **Studies on snow and glaciers in Argentine Republic, p. 332–337.**
Streiff-Becker, R.: **Der Wasserabfluss in einem Gletschertal,** [Runoff in a glacial valley], p. 338–340.
Fisher, Joel E.: **The pressure melting point of ice, and the excavation of cirques and valley steps by glaciers,** p. 341–344.
Fisher, Joel E.: **Pressure melting points of ice and their control on the profile of glaciated valleys,** p. 345.
Ahlmann, Hans Welhelmson: **Preliminary glaciological plans for the Norwegian-British-Swedish Antarctic Expedition, 1949–52,** p. 353–356.
Devik, Olaf: **Ice formation in lakes and rivers,** p. 359–366.
Lambor, Julian: **La genèse de la glace flottante et son apparition sur les cours d'eau de l'Europe central appartenant au bassin Baltique,** [Genesis of floating ice and its appearance in Central European rivers belonging to the Baltic basin], p. 367–379.
Devik, Olaf: **Supercooling and ice formation in open waters,** p. 380–389.
Kaitera, Pentti: **Keeping water from freezing by means of compressed air,** p. 390–398.
Dobrowolski, Antoine Boleslas: **Sur le problème de la réalisation des publications internationales cryologiques,** [Problem of the realization of international cryological publications], p. 399–401.
Dobrowolski, Antoine Boleslas: **L'hydrologie et la météorologie,** [Hydrology and meteorology], p. 402–403.

Volume 3.

Dey, L. J. L.: **The lysimeter station at Castricum (Holland),** p. 11–15.
Ramdas, L. A.: **Report on "Evaporation from bare soil in relation to the depth of the water table or the zone of saturation,"** p. 16–19.
The effect of the yearly fluctuations in rainfall on the flow of ground-water from an extended area of recharge. Investigations into the fluctuations in the natural discharge of ground-water from the Veluwe-district in the Netherlands, p. 47–56.
Wäre, Matti: **About soil humidity variations,** p. 286.

PART IV. AUTHOR AND SUBJECT INDEX

In this section will be found references to the number given at the head of each abstract or entry. In Part I each entry begins with the number 4.7–, and in the bibliography on Jet Stream (Part II) each entry begins with the number and letter 4G–. This index is divided into three parts:

Index of Authors — Index of Subjects — Index of Geographical Locations

INDEX OF AUTHORS

Aichele, Heinz, 4.7–204
Albrecht, Fritz, 4.7–88
Allen, C. W., 4.7–98
American Meteorological Society, 4.7–45, 4G–130
Anderson, Albert D., 4G–88
Andreev, P. I., 4.7–58
Anglo-Egyptian Sudan. Meteorological Service, 4.7–30
Angola. Serviço Meteorológico, 4.7–31
Aniol, Rudolf, 4.7–107
Annalen der Meteorologie, 4.7–21
Arakawa, Hidetoshi, 4.7–78, 4.7–122, 4G–58, 4G–89, 4G–120
Arthur, Robert S., 4.7–5
Aubert, Eugene J., 4G–59, 4G–121
Aujeszky, László, 4.7–59
Austin, E. E., 4G–90

Bannon, John Kerman, 4G–60, 4G–61, 4G–90
Bascó, Nándor, 4.7–60
Bates, D. R., 4.7–218
Becker, Friedrich, 4.7–201
Beebe, Robert G., 4.7–156
Bellamy, John C., 4.7–1
Benninghoff, William S., 4.7–111
Bergeron, Thor, 4G–2
Berggren, R., 4G–18
Berkofsky, Louis, 4.7–48
Bernhardt, Fritz, 4.7–89
Berson, F. A., 4G–31
Biasutti, Renato, 4.7–193
Bilancini, Raoul, 4G–32
Bjerknes, J., 4G–2
Bjerknes, V., 4G–2
Blair, Charles F., Jr., 4G–62
Bleeker, Wouter, 4G–33
Blum, Émile-Jacques, 4.7–212
Böer, W., 4.7–105
Bolin, B., 4G–18
Bolivia. Servicio Meteorológico, 4.7–32
Bossolasco, Mario, 4.7–120
Bradbury, D. L., 4G–74
Browne, Ian C., 4.7–22, 4.7–23
Bryden, Robert R., 4.7–164
Bürger, K., 4.7–209
Bullard, E. C., 4.7–109
Burnight, T. Robert, 4.7–91

Čadež, Marjan, 4.7–152
Carmichael, B. H., 4.7–136
Carr, J. A., 4.7–47
Carson, James E., 4G–74, 4G–87
Carter, George F., 4.7–170
Chaudhury, A. M., 4G–34
Chełchowski, W., 4.7–13
Chicago. University. Dept. of Meteorology, 4G–6
Chiu, Wan-cheng, 4.7–115
Chuman, D., 4.7–131
Clapp, Philip F., 4G–22, 4G–63
Clem, L. H., 4G–121
Cochet, R., 4.7–219
Conrad, Victor A., 4.7–102
Contract AF 19(122)-470, 4.7–225
Contract AF 33(038)-1091, 4.7–226
Contract Nonr-158(00), 4.7–101
Cordes, H., 4.7–199
Cornell University. School of Electrical Engineering, 4.7–226
Costa Rica. Dirección General de Estadística, 4.7–182
Coyle, J. R., 4G–35
Crary, A. P., 4.7–115
Cressman, George P., 4.7–85, 4.7–86, 4G–9, 4G–36
Crocker, A. M., 4G–91
Czarnowski, Maciej, 4.7–139

Daigo, Y., 4.7–100
Dammann, Walter, 4.7–205
Daniels, Sylvia, 4G–72
Daubert, K., 4.7–202
Davies, D. A., 4G–92
Davies, D. M., 4G–37
Davis, N. E., 4G–20, 4G–64
Debor, H. W., 4.7–187
Defant, Albert, 4G–19
Defant, Friedrich, 4G–65
Denisse, J. F., 4.7–212
Dirnagl, K., 4.7–196
Dufour, L., 4.7–142
Durst, C. S., 4G–20
Durward, J., 4G–1

Eady, E. T., 4G–66
East Africa. High Commission. Meteorological Dept.. 4,7–177

LIST OF PERIODICALS

Note: This list contains the titles of the periodicals which regularly contain material on meteorology or related fields and it comprises only a small percentage of the periodicals from which pertinent articles are abstracted.

In this list the preferred form of title entry is given in bold face type. If the title is distinctive, the name and headquarters of the issuing society or organizations follows the title. If the title is not distinctive (for instance, Bulletin, Journal, Trudy, Mitteilungen), the entry consists of the issuing body followed by the title.

PERIODICALS IN WHICH METEOROLOGICAL ARTICLES REGULARLY APPEAR

Académie des Sciences, Paris, Comptes Rendus.
Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. and **Ser. Geofiz.**, [Moscow].
American Geophysical Union, Transactions, National Research Council, Washington.
American Meteorological Society, Bulletin, [Boston].
Angewandte Meteorologie, [Potsdam].
Annalen der Meteorologie, Meteorologisches Amt für Nordwestdeutschland, Hamburg.
Annales de Géophysique, Centre National de la Recherche Scientifique, [Paris].
Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A and **Ser. B,** [Vienna].
Australian Journal of Physics, [Melbourne].
Ciel et Terre, Société Belge d'Astronomie, de Météorologie et de Physique du Globe.
Geofisica e Meteorologia, Società Italiana di Geofisica, [Genoa].
Geofisica Pura e Applicata, Istituto Geofisica Italiano, [Milan].
Geophysical Magazine, [Central Meteorological Observatory, Tokyo].
Hemel en Dampkring, Nederlandse Vereniging voor Weer- en Sterrenkunde, [The Hague].
Időjárás, Az Országos Meteorológiai és Földmágnességi Intézet [Budapest].
Indian Journal of Meteorology and Geophysics, [Delhi].
Journal of Atmospheric and Terrestrial Physics, [London].
Journal of Geophysical Research, [Washington].
Journal of Meteorological Research, [Tokyo].
Journal of Meteorology, American Meteorological Society, [Boston].
Journal Scientifique de la Météorologie, Société Météorologique de France, [Paris].
The Marine Observer, Air Ministry, Meteorological Office, London.
The Meteorological Magazine, Air Ministry, Meteorological Office, London.
Meteorological Society of Japan, Journal, Second Series, Kisho Shushi, [Tokyo].
La Météorologie, Société Météorologique de France, [Paris].
Meteorologische Rundschau, [Bad-Kissingen].
Meteoros, [Buenos Aires].
Monthly Weather Review, U. S. Weather Bureau, Washington, D. C.
Nature, [London].
Nimbus, Sociedad Meteorológica de Bolivia, [La Paz].
Polarforschung, Archiv für Polarforschung in Kiel, [Kiel, British Zone, Germany].
Revista de Geofísica, Instituto Nacional de Geofísica, [Madrid].
Revista Meteorologica, Junta Nacional de Meteorología, Montevideo.
Rivista di Meteorologia Aeronautica, Associazione Culturale Aeronautica, [Rome].
Royal Meteorological Society, Quarterly Journal, [London].
Royal Society of London, Proceedings, Ser. B.
Tellus, Svenska Geofysiska Föreningen, Stockholm.
Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia, [Moscow-Leningrad].
Weather, Royal Meteorological Society, [London].
Weatherwise, Amateur Weathermen of America, Philadelphia.
Wetter und Leben, Österreichische Gesellschaft für Meteorologie, [Vienna].
Zeitschrift für Meteorologie, Meteorologisches Observatorium, Potsdam.

★ Indicates those periodicals which are primarily meteorological.

TABLE OF CONTENTS

Meteorological Abstracts and Bibliography, Volume 4, Number 7, July 1953

Foreword iii
Explanations iv

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

Compendium Articles and Works of Special Interest 773
General Meteorology 776
Meteorological Observations and Instruments 778
Methods of Observation 778
Observational Data 779
Instrument Carriers 780
Instruments 781
Synoptic Analysis and Forecasting 782
Structure and Physics of the Atmosphere 785
Structure of the Atmosphere 785
Mechanics and Thermodynamics of the Atmosphere 788
General Circulation 789
Atmospheric Disturbances 790
Radiation and Temperature 792
Radiation 792
Temperature 794
Soil Temperatures 796
Sea Temperatures 797
Pressure and Wind 798
Pressure 798
Wind 799
Wind Effects 801
Upper Air Winds and Vertical Motion 801
Aqueous Vapor and Hydrometeors 802
Humidity and Evaporation 802
Condensation and Deposits 803
Fog 804
Clouds 805
Precipitation 805
Snow 80
Hydrometeorology 80
Climatology and Bioclimatology 809
Climatology 809
Climate of Particular Places 810
Climatic Changes 811
Microclimatology 812
Climatic Classification 813
Bioclimatology 8
Upper Air Climatology 8
Environmental Influences 8
Synoptic Climatology 8
Miscellaneous Applications 8
Cosmic Influences 81
Optical Phenomena 8
Electrical Phenomena 81
Auroras 819
Radio Meteorology 81
Astrophysics 82

PART II. SELECTIVE ANNOTATED BIBLIOGRAPHY ON THE JET STREAM

Outline of Contents 8
Bibliography on Jet Stream 8
Supplementary Material 84

PART III. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS 846

PART IV. AUTHOR AND SUBJECT INDEXES

Index of Authors 852
Index of Subjects 855
Index of Geographical Locations 86

List of Periodicals ..... Cover